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Stamping Cash Register Parts

Low Scrap Loss, Close Control of Production and Plan for Paying Operators Are Features of Punch Press Department

BY BURNHAM FINNEY*

RAPID growth of stamping operations in the manufacture of products made by the National Cash Register Co., Dayton, Ohio, is a striking example of the increasing use of sheet steel. Punch press department No. 2, one of the two punch press departments, is turning out on a regular schedule many units which formerly were cast from iron in the company's foundry. That it has attained unusual proficiency is shown by the fact that its monthly scrap allowance is set at 0.35 per cent, a figure which was exceeded only twice in 1928. While this achievement commands attention, it is not the sole feature of the department. Its system for closely controlling production, its method of paying press operators, and its provisions for handling a constantly fluctuating flow of materials have resulted in a high degree of efficiency, as well as in many manufacturing economies.

Production orders are received by the department in the form of a material requisition from the stock order department. There are two copies, one for requisition purposes and the other for the department's files. The requisition copy is sent to the stock department as a request for materials. When the materials arrive, they are accompanied by a stock card on which the department clerk puts information about the route and the kind of operations the work takes in going through the punch press department. This information is secured from the department record card on file in the office, and

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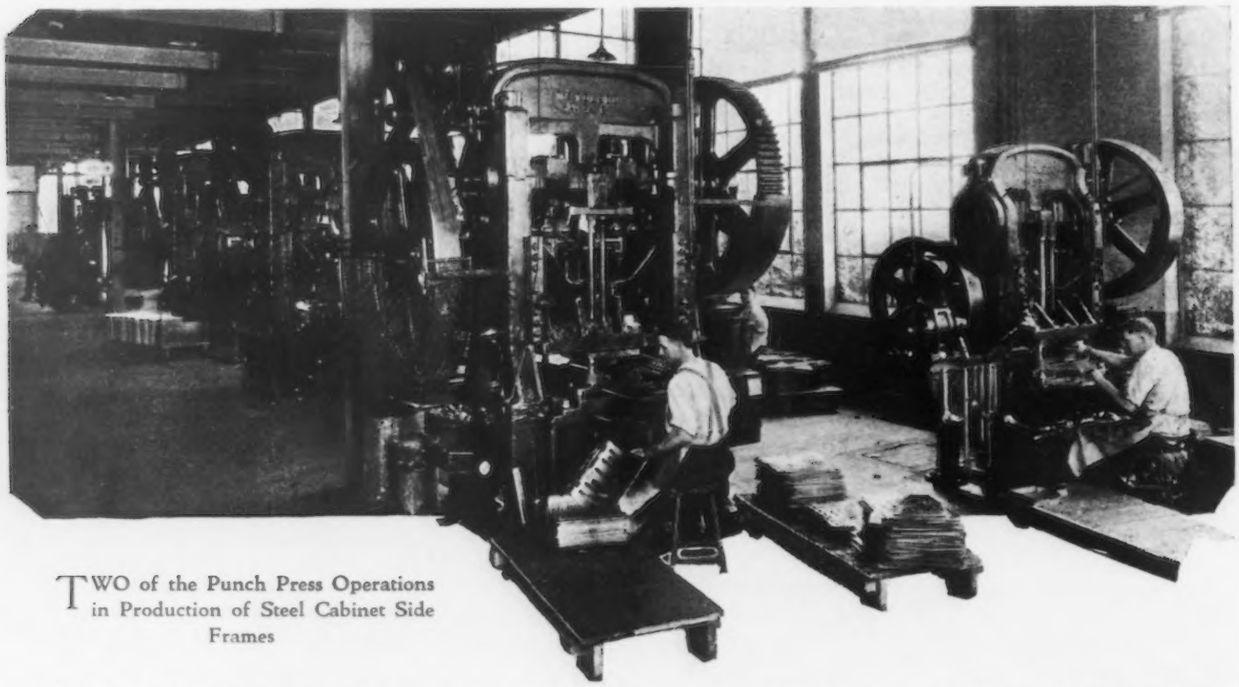
PUNCH Press Operator Earns as Much Setting Up a Job as in Operating His Press. Set-up price includes setting up and removing the die. It is placed and removed with the aid of electric lift truck

incidentally, the location of tools, dies, and bolster plates is recorded on the back of the stock card, which moves with the material to the first operation.

Operators Paid for Set-Up

All jobs on punch presses are set up by the operator under the supervision of a job setter and a job foreman. For this work the operator is paid a "set-up price" which enables him to earn just as much in setting up a job as in operating a press. The "set-up price" includes both setting up and removing the die.

In setting up a job, the press operator calls for the high-lift truck service man, whom he accompanies to the racks where the bolster plates are stored, and also to the supply room for the die. To get dies from the supply room, the operator gives the supply keeper the name of the die, the location and his check number. This information is recorded on a cash register, which prints a check with a duplicate stub attached. The check is filed in a specially designed cabinet and the stub is hung on a hook at the die bin where the part is regularly stored. When the die is returned, the stub and check are destroyed and the transaction is closed.



TWO of the Punch Press Operations in Production of Steel Cabinet Side Frames

The die and bolster plates are transported on a 4000-lb. tiering truck to the press, where the operator sets up the work. Upon completion of this operation, the job setter inspects the job to see that the die is set correctly and that the proper quality of work will be produced. Offhand, the double checking of the job might seem a needless expenditure of time, but the company has proved to its satisfaction that such action pays as a preventive measure against serious errors.

Each new job coming into the department goes through an established routine. The first set-up is checked against the blue print of the job and a part is retained for future reference. The part is put on a sample board of "parts in active production," and is there retained until it has been superseded by an improvement or has been abandoned in favor of a new development. In checking the job when it is set up, the operator always uses the sample, for the sake of accuracy.

While a job is being run through the press operations, the stock card for material is placed on the turret rack, carrying the operator's name, which is located at the job foreman's desk. Upon finishing the operation, the operator tags the material, if it is on a skid platform. If the stock is carried in boxes or trucks, a special form is made out by the operator, giving the box or truck number. This is entered on the stock card by the assignment clerk, so that the stock can be located for the next operation. The operator then either goes ahead with the next job, with the material stocked at the side of the press, or has the material trucked to a "work in progress" storage place. When all of the operations on a part have been completed, the material is either sent to the next department or is retained in the producing department, where it is held temporarily, ready to go out in accordance with the regular production schedule.

In view of the fact that the department must turn out a limited quantity of each of a multitude of parts, a condition which demands flexibility on the part of the equipment, the large punch presses are used for either blanking, forming or piercing work. All dies and bolster plates are made so as to be interchangeable on all presses of the same make and model. Thus, in case of trouble, work can be shifted from one press to another. In the purchase of new presses the company specifies that the ramholes and screw holes in the bed of the press are to be drilled to standardized templets. Incidentally, there are many bolster plates which have more than 100 dies located on them.

Storage of Dies and Bolster Plates

Bolster plates are stored on racks specially designed for them, so as to conserve floor space and to minimize handling time. Blueprint records of bolster plates are kept on file only in the designing department, to eliminate duplication. Standard tool design practice is utilized, so that die shoes conform properly to the bolster plates.

Special attention is paid to the matter of storing dies in orderly fashion. For this purpose there are five double racks, each of which is eight shelves high, with seven separate sections or bins on each shelf. Thus each die has a compartment in which it is housed when not in use. Large dies are stored on the lower shelves, where they can be handled most readily by the press operator on to and off of the tiering truck which takes them to the presses.*

Small dies, on the other hand, are marked with a star for identification purposes and are stored on the higher shelves. Since they cannot be handled to and

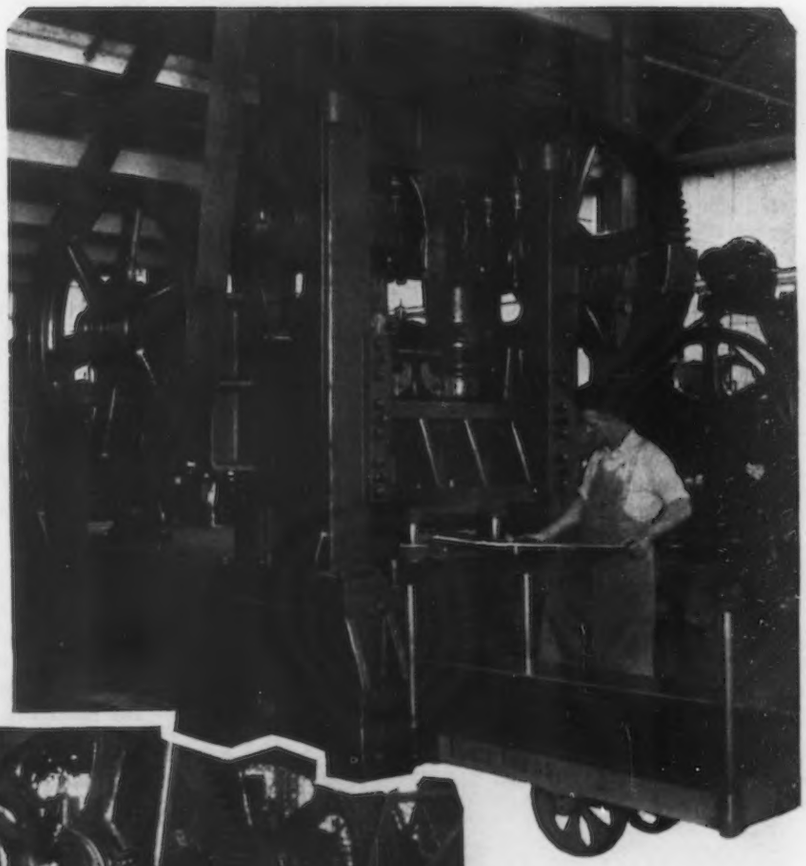
*See article in our issue of April 4, page 935, for illustrations of the method of handling dies and bolster plates.

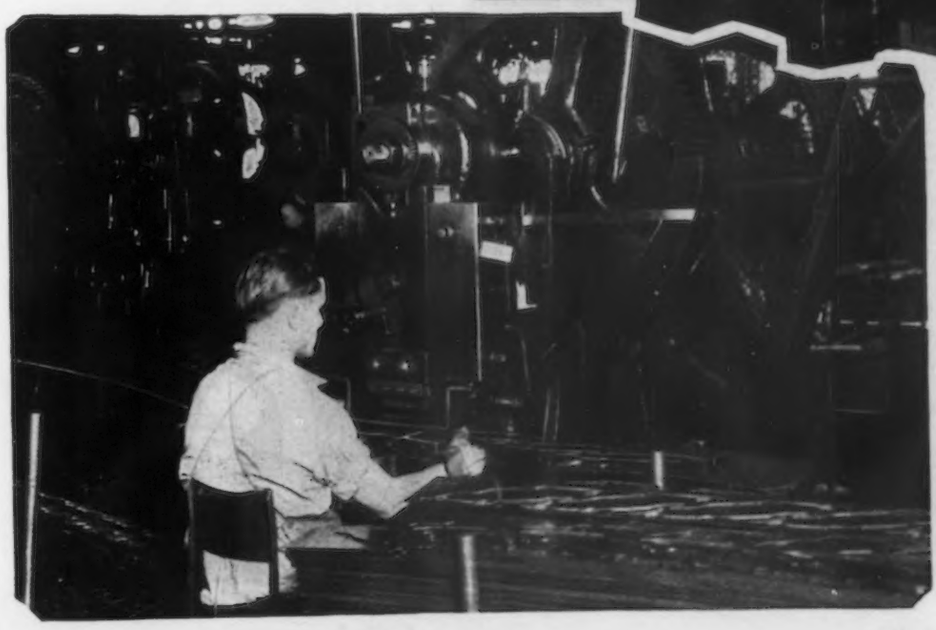
SCREW Plates Are Welded on the Side Frame of the Class 1800 Cabinet

LARGE Punch Presses (Below) Are Used for Either Blanking, Forming or Piercing Work. All dies and bolster plates are interchangeable on all presses of same make and model

from the storage racks by the tiering truck, they are placed on a receiving table at the end of the racks when they come from the presses, and are put into their compartments by the supply keeper, who uses an electric tiering elevator for this purpose. The supply keeper likewise removes them from the racks when they are needed by press operators.

While a large number of parts are produced by the department only on specific orders, many jobs are scheduled on a daily routine basis. Outstanding in this respect is what is known as the class 1800 cabinet, on which from 18 to 22 operations are completed in the punch press department. The work consists of numerous punch press operations, spot welding of screw plates and hinge plates on the cabinet, polishing the cabinet after punch press and welding operations, so that it can be properly enameled, and straightening and adjusting of the cabinet frame. In many cases screw plates, angles and other small parts are blanked





SCREW Plates and Other Small Parts Are Blanked on Small Presses from Scrap Frame Metal Left from Larger Parts

NAME _____ PAGE NO. _____

USAGE PER MATERIAL _____ NO. PER STRIP _____ B. P. NO. _____

OPER. NO.	DIE INFORMATION			REMARKS	MACHINE		BOLSTER PLATE AND LOCATION	SUB PLATE	SECTION
	DIE OR NO.	REC'D	LOCATION		NO.	KIND			

COMPLETE Information About Every Part Going Through the Department Is Recorded on This Card

on punch presses from the scrap remaining from operations on larger parts.

From sheet steel the department is producing many parts which a few years ago were made of cast iron. The ease with which parts can be turned out in given quantities, the light weight of the material, the greater tensile strength of steel as compared with cast iron, and the large reduction in breakage are the factors responsible for the change.

For convenience and for economical production the department is divided into four sections, as follows: *A* contains the large punch presses; *B* specializes on mass production of parts which must be turned out every day; *C* takes care of two items as a unit production, putting from 20 to 30 operations on a daily scheduled basis; and *D* is devoted to small press work.

Weekly Production Report Sheet

To keep abreast of the activities of the department, the foreman has prepared for his information a weekly production report sheet which shows for each of the four sections of the department the number of orders on hand, number received during the week, number finished, number in process, number of parts finished and number of employees. At the left side of the sheet is a combined report for all four sections. It is easy to compute from these data the amount of work ahead and to ascertain the work that each section is doing.

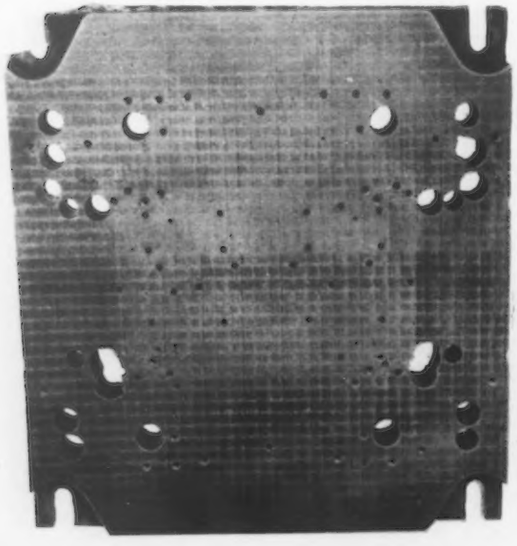
Information for the weekly production report comes from the job foremen of the various sections and from the department's office records. For instance, each job foreman keeps a department work sheet, on which is entered each order which he receives. When the job is finished and is ready to leave the department, the floor man in charge crosses the order off the work sheet, which contains the order number, name of part, quantity ordered, due date and date ordered.

To guard further against error, information in regard to each order is entered on an "outgoing record," giving the order number, part name, due date, quantity ordered, check number of man working on last operation, date completed, and designation of the department to which the job was forwarded. The floor man maintains the "outgoing record."

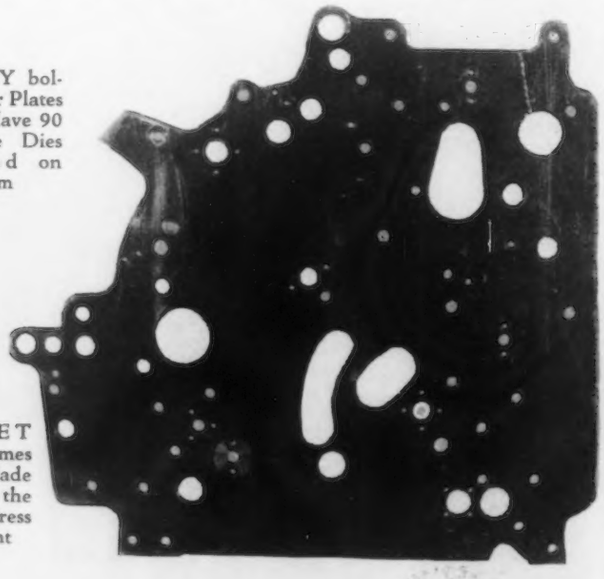
The company has found from experience that this system of records has resulted in close control of all factors entering into production, and has practically eliminated serious errors. The punch press department is a "starting department." Consequently more records are required than in a department where one, or possibly two, operations are performed on a part which originated in another department, and which must go on to other departments before it is completed.

Although stamping of parts from sheet steel already has extended far beyond the proportions anticipated 10 years ago by the management, further expansion of this type of work is contemplated. What part sheet steel will play in the manufacture of cash registers in the next few years only the future can disclose. But it is safe to predict that its use will show a steady growth, indicative of the adaptability of this material to the needs of the various parts.

"Precipitation of Lead and Copper from Solution on Sponge Iron" is the title of Bulletin No. 281 of the United States Bureau of Mines. It is compiled by C. L. Oldright, H. E. Keyes, Virgil Miller and W. A. Sloan of the bureau. It contains 131 pages and is well illustrated with charts and photomicrographs. The results of the experiments described are largely a record of the behavior of sponge iron as a precipitant of lead and copper under laboratory conditions, comparable to those that would obtain in a commercial plant, were it attempted to secure the maximum contact between solution and precipitant.



MANY bolster Plates (Left) Have 90 or More Dies Located on Them



CABINET Side Frames Now Are Made of Steel in the Punch Press Department

Heat-Treated Low-Manganese Steels

Oil-Quenched and Drawn Castings, Forgings and Machined Parts of Intermediate Properties and Costs Becoming Popular in American Shops

BY E. E. THUM

AN ARTICLE on "High Strength Structural Steels," published in THE IRON AGE of March 21, described the undeserved reputation for brittleness which was borne for so many years by steels containing a slight excess of manganese, and how these steels in certain ranges of composition develop excellent physical properties in the "as-rolled" condition. Plain manganese steels within the same ranges, with or without other alloys, have also achieved success for heat-treated parts, as can be seen by comparing Fig. 2 and Fig. 3.

PERTINENT information is contained in this article on metal for the following purposes:

Shock-resisting castings

* * *

Anchor chain

* * *

High-test welding rod

* * *

Carburizing steel

* * *

Heat-treated forgings

* * *

Bolts for high-temperature steam valves

* * *

Rifle barrels

* * *

Leaf and helical springs

* * *

Shear blades

* * *

Gages (non-deforming)

Metallography of the Alloys

Knowledge about the true effect of a minor percentage of manganese in steel has been masked by the variable effects of fluctuating carbon, silicon, or the other elements contained, and has awaited experimentation with specially made alloys of high purity. Recent experiments with alloys of great purity prove that iron-manganese alloys through a wide range are remarkably tough. Brittleness comes with carbon.

As shown on the Guillet diagram, Fig. 1, a rather modest amount of carbon and manganese in combination forms steel which has martensitic structure under the microscope, and is hard and brittle after slow cooling. Such brittle steels have found no practical applications. Combinations well within the pearlitic triangle (approximately limited to less than 1.75 per cent Mn at 1.0 C and 2.5 Mn at 0.25 C) have, however, proved most useful for various purposes. With heat treatments especially adapted for them, it has been amply demonstrated that such analyses respond as certainly and as uniformly as any other well made alloy steel, and require no closer control. Far from being brittle, high impact values are shown in laboratory tests. Successful use in heavy railroad rails, shear blades, rifle barrels, and automobile axles testifies to the inherent toughness of low-manganese alloy steels when the correct relationship among carbon, manganese, steel practice, heat treatment and use is maintained.

Manganese and iron are very similar chemically; in metallic alloys they form a continuous series of solid solutions; that is to say, manganese atoms are able to replace iron atoms in either gamma or alpha iron crystals with a minimum derangement in the space lattice. Probably because the elements are so alike, the speed of diffusion is unusually slow, and the cored crystals formed during solidification persist in later history. Special care to control pouring temperature and mold conditions is therefore necessary when making either ingots or castings. Heat treatments must be longer continued than for ordinary steels. Furthermore, high heatings do not unduly reduce the toughness as would occur in plain carbon steels. Banded structures (sometimes called "fiber," the relic of cored crystals existing in the ingot) are frequently shown when forgings or rolled products are split and etched.

A minor portion of the manganese forms a compound Mn_3C with carbon, analogous to cementite Fe_3C. Some metallurgists believe that some double carbide $(Fe_3C)_2Mn_3C$ also exists, even in steels containing less than 1 per cent manganese.

Increasing manganese lowers progressively the transformation temperatures in steels, especially on cooling. With 1 per cent manganese both Ar_3 and Ar_1 are lowered about 100 deg. Fahr. This means that the alloys may be furnace cooled from the soaking heat to a temperature before quenching considerably lower than would be possible with a plain carbon steel. It also means that the drawing temperatures will be lower than for carbon steels. As above remarked, manganese renders the hardening reactions more sluggish than do other alloying elements which have an equal effect on the transformation range; hence the necessity for long times at heat. One per cent of manganese also shifts the eutectoid composition to 0.8 per cent carbon.

As a result of the above characteristics, normalized low manganese alloy steels of the analyses under discussion tend to retain sorbite rather than to develop well-defined pearlite, and the amount of free ferrite after annealing is reduced. In normalized steels the grain size is also decreased. Manganese increases Brinell hardness one number for each 0.02 per cent, in the medium carbon ranges.

Carbon and manganese seem to augment each other in their effect on strength. Carbon, of course, is the most potent strengthener. But each 0.01 manganese will add

100 lb. to the ultimate strength of a low-carbon steel, and the same amount strengthens medium-carbon steel by 250 lb. per sq. in. Proportional limit is also raised more rapidly and "stabilized"; strengthening with a moderate amount of manganese does *not* cause a proportionate loss in ductility—in this the true facts of the situation are directly contrary to the reputation that manganese has acquired as an embrittling impurity.

High-Strength Castings

Lower carbons between 1.0 and 2.0 manganese give high-strength castings. These castings also have in the neighborhood of 0.30 per cent silicon, but since all Bessemer and open-hearth steel for casting into sand molds is deoxidized with an excess of ferrosilicon, this residual analysis should probably be regarded as a characteristic of cast steel rather than warranting classification as a "silicon" alloy.

Cast steel containing 1.25 per cent manganese was developed by Dr. Henry Marion Howe and John Howe Hall, and first made commercially in America in 1909 into dredge buckets and bucket-teeth, in response to a demand for material that would wear longer and break seldomer than plain carbon steel castings. Comparative physical properties are shown in Table I.

Table I—Properties of High-Grade Cast Steels

Chemical analysis	Carbon Steel	1.25 Manganese Steel
Carbon	0.45—0.55	0.20—0.30
Manganese	0.60—0.80	1.10—1.40
Heat treatment	A	B
Physical properties		
Ultimate strength	82,000 to 92,000	80,000 to 90,000
Yield point	46,000 to 51,000	52,000 to 57,000
Elongation in 2 in.	20	28
Reduction in area	25	55
Charpy impact	10	32
Microstructure	Very fine pearlite and ferrite	Sorbitic

Heat treatment A: Heated at 1650 deg. Fahr for 5 hr., cooled in air, reheated to 1250 deg. Fahr. for 8¾ hr., cooled in air.
Heat treatment B: Heated at 1650 deg. Fahr. for 5 hr., quenched in water; reheated to 1200 deg. Fahr. for 6½ hr. and cooled in air.

It will be noticed that the carbon steel casting, by virtue of high carbon and a special heat treatment, has been given unusually high properties; nevertheless higher manganese and lower carbon combined with the water quench have notably increased the yield point, toughness and impact strength. Furthermore (as in normalized structural steels), the yield point is sharply defined in manganese-bearing castings. This is not true of carbon steel castings. The physical properties shown in Table I almost approach those of high-strength structural steel in the rolled and normalized condition, but represent the normal tests on this material when properly made.

For these reasons 1 to 2-per cent manganese steel castings were largely used in ordnance during the war, and now are made into car coupler knuckles, locomotive, truck and tractor parts where an especially high grade casting is required. An interesting application of 0.35 per cent C, 1.35 per cent Mn is for cast steel anchor chain; besides its strength and toughness it resists sea water corrosion excellently. This is probably due to the very fine grain size of the sorbitic structure and the lack of free ferrite, rather than to any intrinsic characteristic of the manganese.

Manufacture of 1 to 2-per cent manganese steel castings requires best furnace practice. If the pouring temperature is high and the mold is such that it takes a long time to cool to the somewhat depressed critical range, large grains and dendritic crystals will be formed which are very difficult to eliminate in subsequent heat treatment. A plain anneal, such as is given ordinary carbon steels, produces the same microstructure in a well-made manganese steel as the carbon steel would have after similar treatment, but results in low tensile and impact strengths; an unusually long time at annealing temperature is required to develop a fine pearlitic or sorbitic structure and bring out the best physical properties. Vanadium (0.25 per cent) is sometimes added to these castings; other conditions being equal, it increases the ultimate and elastic limit about 10,000 lb. per sq. in., reduces the ductility somewhat, but increases the impact slightly.

High-Strength Welding Rod

Welding rod is not a heat treated material, yet a brief note is not out of place here because a first class fusion weld is in the nature of a high-strength casting. A second reason is that a much used proprietary material contains high manganese and silicon, as shown in the last column of Table II.

Table II—Composition of Welding Rods

	"Norway Iron"	Mild Steel	"High Test"
Carbon, per cent	0.05	0.25	0.20
Manganese	0.15	0.45	0.80
Silicon	0.01	0.02	0.55
Composition of Weld Metal Obtained From the Above			
Carbon, per cent	0.03	0.08	0.18
Manganese	0.07	0.20	0.48
Silicon	0.01	0.01	0.25

Comparison of the analyses both before and after having been melted (as by the oxy-acetylene flame) shows that carbon burns out unless protected by a surplus of manganese or silicon. For that reason the probable strength of a weld made by a good workman with so-called Norway iron rod will be only 47,000 lb. per sq. in., whereas 58,000 lb. may reasonably be expected from joints made with the "high test" rods.

Carburizing Steel with More Than 1 Per Cent Manganese

Most American purchasers of steel for case hardening specify low manganese, probably on the theory that the surface will be converted into a high-carbon steel, and this should have restricted manganese in order to avoid cracking when water quenched. On the other hand, British practice permits 0.70 and even 0.90 per cent manganese; it gives a sound hard case, and a tougher, stiffer core. The properties after quenching and drawing are shown in Fig. 4, from "Automobile Steel Research Report, 1920."

Effect of the mass of the piece on the condition of the core is shown by the following tensile tests on pieces cut from bars of various diameters. Preliminary heat treatment was: Pack hardened, reheated to 1650 deg. Fahr. and quenched in water for refining the grain, reheated to 1400 deg. Fahr. and quenched in water for hardening the case.

	¾-In. Bar	1½-In. Bar	2¼-In. Bar
Ultimate strength	115,000	90,000	85,000
Yield point	63,000	55,000	54,000
Elongation	29	35	35
Reduction in area	52	64	64
Izod impact	59	89	75

The general excellence of such higher manganese steels for case hardening—i. e., uniform carburization, tough cores, and uniform hardness—warrants much more attention from American users.

A special carburizing steel (S. A. E. Specification 1315X) is now on the market which carries this matter even further to a steel for oil hardening. Its chemical limits are carbon 0.10 to 0.20, sulphur 0.08 to 0.13, and manganese 1.25 to 1.75 per cent. The cores of 1½-in. bars of this material after double heat treatment can have Izod impacts over 90 ft.-lb. Higher manganese reduces the chance that the steel may be "abnormal" and develop soft spots after case hardening. Sulphur in this analysis is high enough for easy cutting in screw-machine products; the high manganese also counteracts the brittleness to be expected from unduly high sulphur.

Quenched and Tempered Forgings

Fig. 3 (in conjunction with Fig. 2) shows that a fairly wide range in carbon steels containing more manganese than the normal have proved suitable for heat treated

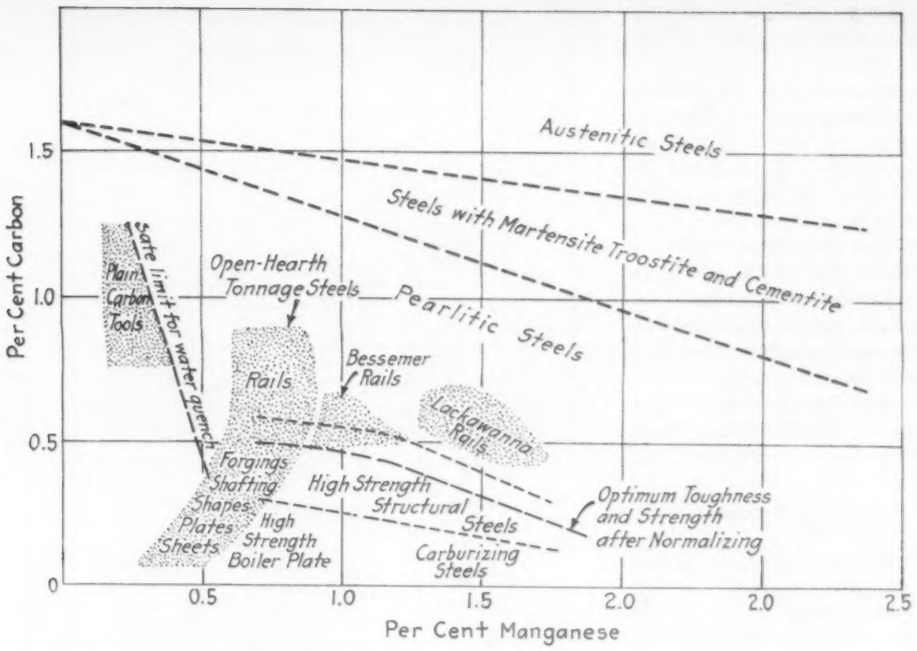


FIG. 2. Manganese Steels Used Without Heat Treatment After Fabrication. Silicon in these steels is ordinarily less than 0.30 per cent

parts. Most of it sold in America is along the lower boundary of the area, containing from 0.30 to 0.50 per cent carbon and 1.0 to 2.0 per cent manganese. It is becoming more popular as an easy working steel of moderate price, with enhanced properties after heat treatment midway between plain carbon steels and the chromium-nickel steels.

Some unsatisfactory experiences with heavy forgings within the upper limits of this range have been reported. The steel was found to be segregated, to contain too many silicate inclusions, and a coarse structure (large grains of pearlite) which could be refined with great difficulty. Probably such steel was cast too hot and before the refining reactions had been completed; the solidified ingot then had large crystals separated by slag particles, the latter in turn interfering with subsequent grain refinement and causing "ghost lines," "streaks" and other defects encountered in large forgings. It is now generally recognized by steel makers that manganese steels require "alloy quality" rather than "tonnage practice," especially when the manganese exceeds 1.75 per cent; when the forging shop practice is correspondingly careful, it has been

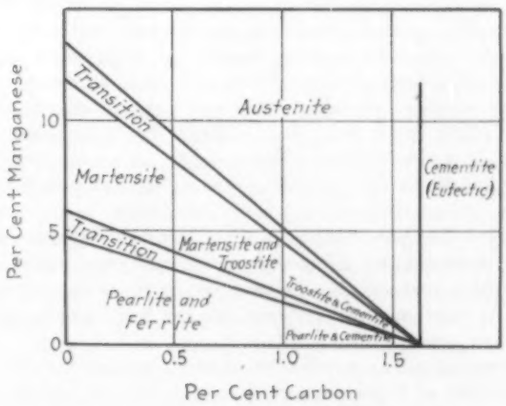


FIG. 1. Guillet's Diagram Showing Microstructure of Forged and Air-Cooled Iron-Manganese-Carbon Alloys

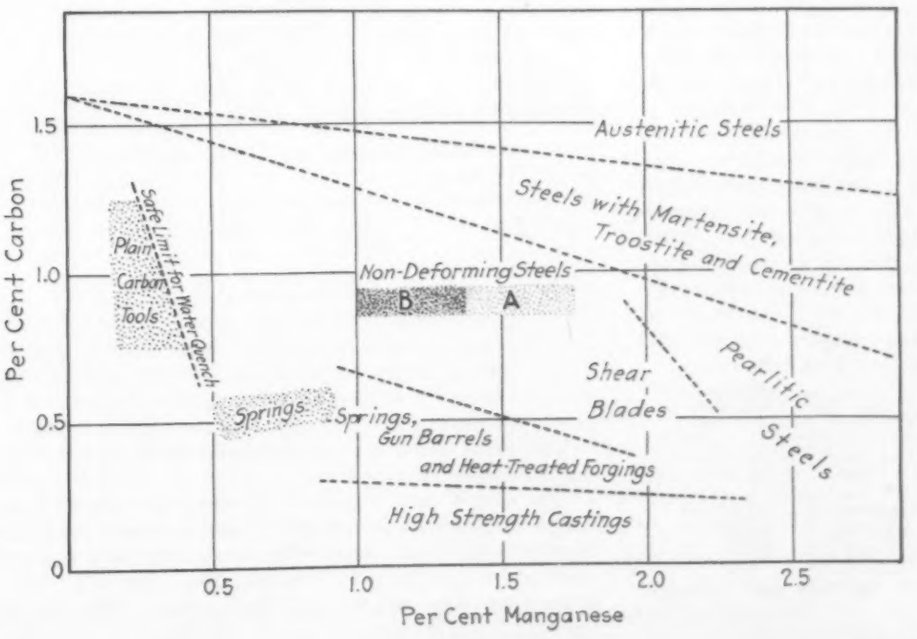


FIG. 3. Low Manganese Steels Used After Special Heat Treatment. High silicon or other alloy marked with double hatching

demonstrated that such steels forge well into difficult shapes and are preferable to other analyses capable of developing similar physical properties.

Manganese steels, while tending toward air-hardening, do not harden deeply. The characteristic condition in a quenched 5-in. round after tempering at 900 deg. Fahr. would be a good impact value at the center (Izod 45 to 65), but an elastic limit lower than would be expected in small test pieces of equal hardness.

Fig. 3 indicates how carbon and manganese very inversely along the upper boundary of the useful area. It has been stated that carbon should be less than 0.30 per cent if manganese is about 1.75, but since steels with 10 points more carbon have been successfully used for automobile axles, the first mentioned carbon limit is too conservative. Comparison with other steels heat treated to medium ultimate strength (Table III) shows that these manganese steels are closer kin to alloy steels than they are to carbon steels.

Table III—Plain and Alloy Steels Heat Treated to 135,000 Lb. Ultimate Strength

	C 0.55	C 0.51, Mn 1.35	C 0.34, Mn 1.88	Ni 3.61
Proportional limit....	93,000	117,000	114,000	126,000
Elongation in 2 in....	18	20	17	21
Reduction of area....	51	53	57	59
Izod impact.....	14	58	68	65

It must be remembered that the impact strength is not so good as that of the nickel and chromium alloy steels when heat treated to ultimate strength of about 200,000 lb. per sq. in.; in other words, the manganese steels are most useful in the intermediate ranges. A high value of the true elastic limit is another characteristic, as discussed at length in the former article about normalized structural steel (THE IRON AGE, March 21). As the carbon and manganese are increased, however, an oil quench and long draw are necessary to develop the valuable physical properties. Long time at heat is an advantage, rather than a danger. Temper brittleness (i. e., reduced impact values after slow cooling from the draw) has been reported in the higher manganese analyses, but may be controlled by care in steel making and preliminary heat treatment, as with chromium-nickel steels.

Some of the uses (other than drop forgings for automotive parts) of this class of material follow: A 1.5-per cent manganese steel is favored for bolts for high-temperature steam valves and fittings, but whether this material has an exceptionally high creep range is doubtful. Armor piercing shells of manganese steel have promise; ballistic tests show that, if they do not penetrate the plate, they mash rather than split. Certainly they are not brittle.

Rifle barrels made since 1904 at Springfield Arsenal and elsewhere contained 0.50 carbon and 1.25 manganese (double the normal amount: 0.65 per cent). It was found that a very long time at drawing temperature increased the ductility of both steels about 25 per cent, but the low-manganese steel lost 5 per cent of its proportional limit and ultimate strength, whereas the higher manganese steel dropped but 0.5 per cent. The latter had excellent machinability, and was held at 120,000 ultimate strength, 85,000 lb. yield point, 23 per cent elongation and 55 per cent contraction. Axle shafts, steering parts, high-duty bolts and studs for automobiles are being extensively made of manganese steels, either basic, open-hearth or electric. Specification and average properties of material known as "G.M.C. 1335" in 1-in. bars is as follows:

Analysis	Specification	Average of 51 Open-Hearth Heats
Carbon	0.30 to 0.40	0.35
Manganese	1.60 to 1.90	1.77
Silicon	0.15 to 0.30	....
Physical properties		
Ultimate	140,000	162,500*
Yield	125,000	152,500*
Elongation in 2 in.....	15	15.8*
Reduction	50	55*

*After water quenching from 1550 deg. Fahr., and drawing at 900 deg. Fahr.

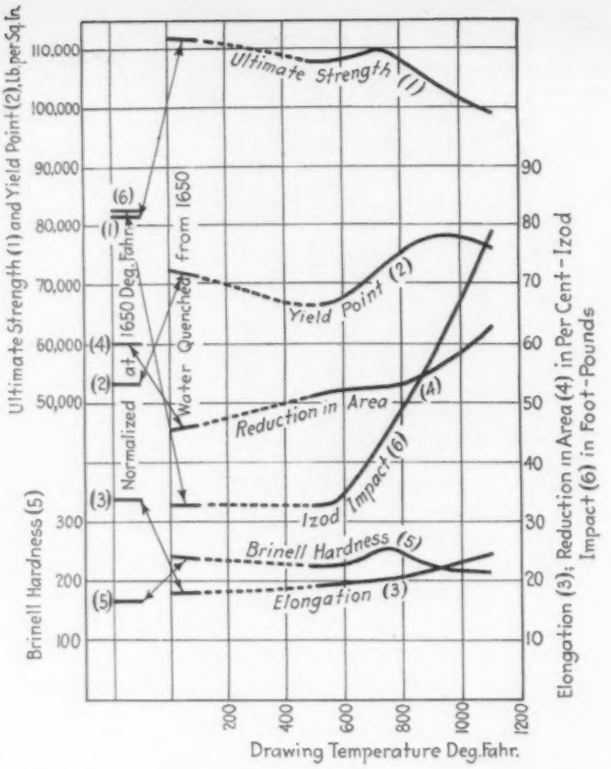


Fig. 4. Properties of High-Manganese Carburizing Steel

Carbon	0.20
Silicon	0.10
Manganese	1.00
Sulphur	0.07
Phosphorus	0.05

Test pieces cut from 1⅛-in. rounds after heat treatment

Springs also contain considerable manganese. "Tempered wire" with 0.60 C, 1.15 Mn, is widely used for coils by mattress and upholstered furniture manufacturers. Gun recoil springs for small-caliber naval ordnance are made of about the same analysis. Helical springs made of ¾-in. round rod, oil quenched and drawn, have withstood severe proof tests, and behave well in service.

The cross-hatched area marked "springs" on Fig. 3 represents silico-manganese steels used principally for vehicle leaf springs. If received from the mill with Brinell hardness less than 300 it can be sheared and punched cold. Analyses and properties are indicated in Table IV, and the physical properties of an electric furnace steel of the analysis given in the third column are shown in Fig. 5, as determined by Hankins, Hanson and Ford.

Table IV—Silico-Manganese Springs

Chemical composition	S.A.E. 9250	S.A.E. 9260	Steel Tested in Fig. 5
Carbon	0.45 to 0.55	0.55 to 0.65	0.55
Silicon	1.8 to 2.2	1.8 to 2.2	2.0
Manganese	0.6 to 0.9	0.6 to 0.9	0.95

A representative heat treatment for the S. A. E. steel is: oil quench from 1575 to 1600 deg. Fahr. and temper at 950. The steel described in Fig. 5 required an oil quench from 1740 deg. Fahr. or a water quench from 1600 deg. Fahr. to develop a full martensitic structure. Brinell hardness after draws above 750 deg. Fahr. are about the same, but the other physical properties are slightly better after the water quench and draw.

The silicon and manganese permit a wider temperature range in forming and hardening than is proper for plain high-carbon steels, but the silico-manganese steel is more sensitive to variations in heat treatment than, e.g., chromium-vanadium steel used for leaf springs. The former

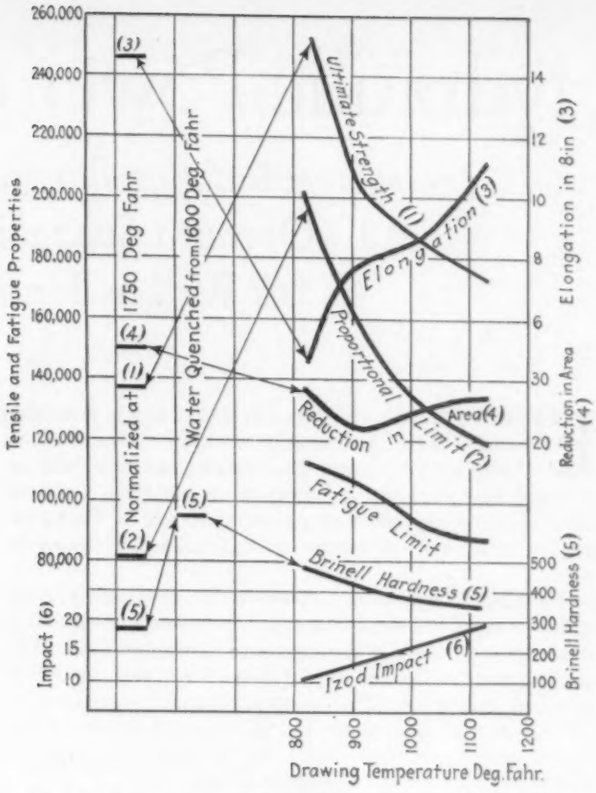


Fig. 5. Properties of Silico-Manganese Spring Steel

Carbon	0.55
Silicon	2.0
Manganese	0.95

Water quenched from 1600 deg. Fahr., and drawn

is favored in America principally by factories which have accurate temperature control and orders for very large quantities. Here again the quality is intermediate between carbon steel and more expensive alloys; the manganese is valuable to prevent excessive scaling and to insure against large grain growth if overheated. Materials of this general analysis used in France are so much lower in manganese as to warrant classifying them as silicon steels.

Silico-manganese steels have also been made into helical springs for electric locomotive drives, railroad rolling stock, and other severe duties. Excellent furnace practice and uniform microstructure are essential to satisfactory performance in the finished product. Preferred manufacturing procedure includes coiling on a hot mandrel at 1700 deg. Fahr., notch for length, and cool slowly. Then preheat slowly to 1300 deg., soak at 1650, quench in oil and draw in a salt bath at 850 deg. Fahr. This gives ultimate strength of 200,000 lb. per sq. in., a hardness of 375 to 450, and a spring which will operate at a lower factor of safety than other analyses heat treated to equivalent properties.

Shear Blades

A considerable area on Fig. 3 represents compositions suitable for shear blades for cold-cutting iron bars and scrap. Steel with as high as 0.80 per cent carbon and 2.0 per cent manganese can be successfully hardened in masses weighing 500 lb. After oil quenching and a draw, these comparatively cheap steels will give as good or better service than a chromium or chromium-vanadium steel with the same carbon content.

"Non-deforming" or "non-shrinking" steels as originally proposed by John A. Mathews contain 0.80 to 0.95 C and 1.5 to 1.75 per cent Mn (Class A). About 0.5 per cent of the manganese was later replaced by an equal amount of chromium, with sometimes 0.5 per cent of tungsten as well (Class B). Any of these analyses may contain a little vanadium with advantage. The more complex alloys, although more expensive in raw cost, are somewhat easier to make and forge, and to machine when in the annealed condition.

The name is something of a misnomer. It should be "small-deforming." All the steels do change in volume slightly during heat treatment, but the changes are slight, and the heat treatment can be so selected that the principal dimensions after hardening will be almost exactly the same as before. Consequently these steels are favored for plug and thread gages, delicate stamping dies, master tools, hobs, taps and broaches, and flat surfaces.

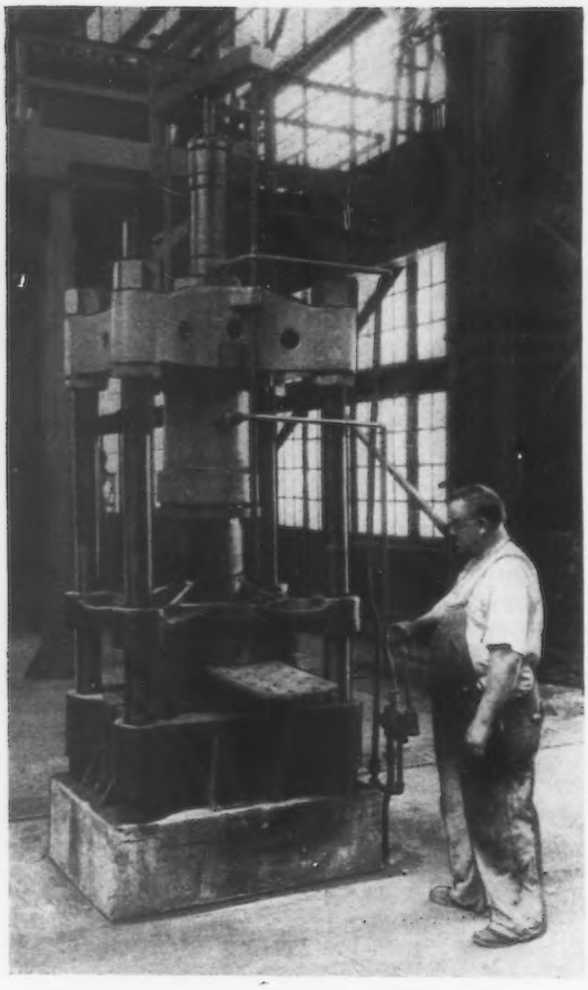
Heat treatment causes the same metallographical changes in both classes. Preliminary annealing of Class A is done at 1400 deg. Fahr.; Class B at 1475. Annealing after machining is desirable for intricate or non-symmetrical shapes. After a slow and even preheat, quench in oil (Class A from 1400 to 1475; Class B from 1450 to 1500 deg.) without swishing, remove at about 212 deg. Fahr., and temper immediately. Salt baths are best to prevent decarburized or oxidized surfaces, although the manganese is high enough so a very thin adherent scale is produced by proper heating in a muffle furnace. Draw-back temperature may be so adjusted that when the scale is polished off the correct size remains.

Study of the volume changes indicates that non-deforming steels retain a considerable quantity of untransformed austenite after the oil quench, scattered about in the bulk of the martensite. The latter progressively decomposes into troostite at temperatures beginning at 200 deg. Fahr., and this change causes a contraction in volume. After reaching 500 deg. the retained austenite transforms to martensite and expands, this entire change taking place within a narrow range; above 550 deg. this secondary martensite also tempers (and contracts). Small volume change requires a heat treatment schedule such that these contractions and expansions cancel each other. Owing to the preponderating amount of martensite present at all times, the surface hardness is substantially constant for all draws below 600 deg. Fahr., and varies little for steels of Class A and Class B.

More Light on Complex Sieving Problems

Very rapid have been the developments in the production of sieving machinery in recent years, but according to Dr. J. B. Porter of McGill University, Montreal, Canada, our knowledge of the fundamental principles underlying the subject has not kept pace with this rapid development. Experiments were therefore undertaken in an effort to throw more light upon certain complex sieving problems. The work was performed in the mining and metallurgical laboratories of the University at Montreal under Dr. Porter's direction and with financial assistance from the National Research Council of Canada. The complete account of the work is found in Report No. 22 entitled "An Experimental Study of Sieving," and a few of the facts follow:

An extensive series of large-scale tests was carried out on a well-known make of electrically-vibrated screen. An attempt was made to vary only one factor at a time, in order that its effect might be determined as accurately as possible. The variations studied include the slope of screens, the amplitude and frequency of vibration, the screening rate, "difficult" grains, blinding of screens, and the effect of variations in composition of feed on the screening rate and on the quality of the products. The results obtained are of both practical and theoretical value, giving information useful in the design and operation of screens and affording new knowledge of the principles involved.



FORMING Press of 150 Tons Capacity Used to Bend Butt Straps and Similar Parts for Locomotive Boilers. The butt strap in the picture is punched for double riveting

Hydraulic Power at

Locomotive Building Illustrates lically Operated Special-Pur as Well as Massive

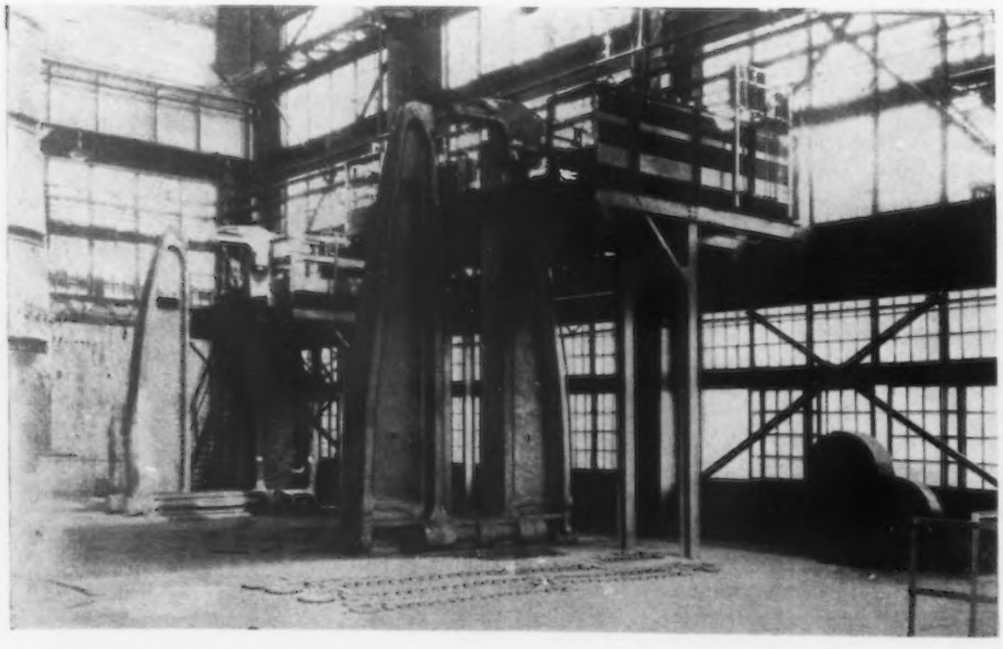
EXTENSIVE use of hydraulic machinery is a notable feature in the new plant of the Baldwin Locomotive Works at Eddystone, Pa. Among the wide variety of machines employed in locomotive building, some of them of extremely massive construction, will be found examples of a great diversity of applications of hydraulic power.

Although the machines at the Baldwin Works are designed primarily for operations connected with the building of locomotives and tenders, yet the principles illustrated, and in many cases the actual operations, are applicable to other industries. The presses that shape locomotive frames, or bend steel plates for the tanks of tenders, differ only in size from those used in forming operations in making all sorts of articles from metal.

A first impression of the visitor at the Baldwin plant is that of vast spaces. Machines are separated by distances of 20 to 30 ft., or even more. Between them are areas of empty floor space. The explanation of this seeming lavishness in the use of valuable space is found in the size of the work handled on these machines. Plates 20 ft. wide, such as are used in building locomotive tender tanks, cannot be handled in restricted areas. The frame of a locomotive needs most ample aisles between the rows of tools.

Hydraulic power for operating tools and special machinery in the Baldwin Works is supplied by a battery of electric pumps. These pumps deliver 1000 gal. of water a minute, under a pressure of 2000 lb. to the square inch, to three huge accumulators built by the Southwark Foundry & Machine Co., Philadelphia, which supplied a large

*1321 Arch Street, Philadelphia.



A PAIR of Hydraulic Riveters Capable of Taking a Boiler Shell 22 Ft. Long. These are so designed that rivets can be driven close to the firebox sheet

the Baldwin Works

Tendency Toward Hydraupose Machines—Delicate Tools Required

BY JOHN MORRIS COMBS*

part of the hydraulic machinery used at the Baldwin plant.

From the accumulators, the water is distributed to the machines through an extensive system of high-pressure mains. A battery of steam pumps is held in reserve for use in case the electric pumps are temporarily out of commission.

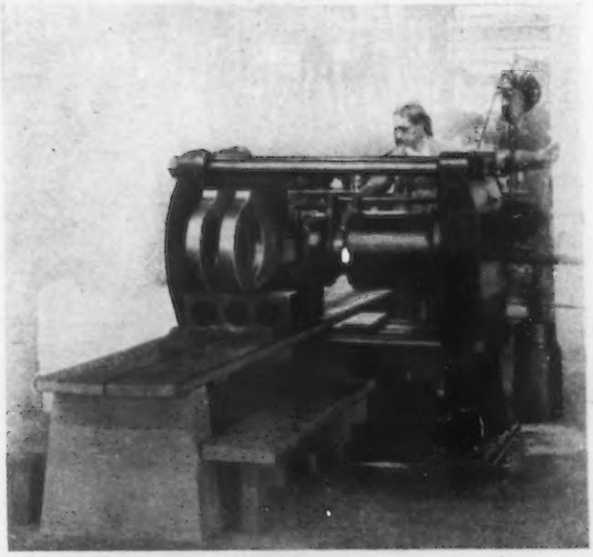
For some types of work it has been found advantageous to build the machine as a self-contained unit with a motor-driven hydraulic pump, especially designed for such service, as an integral part. The Hele-Shaw rotary pump is an example of such a pump. It has a variable discharge which can be regulated from zero to a maximum, or reversed in direction, without changing the speed or direction in which the pump rotates.

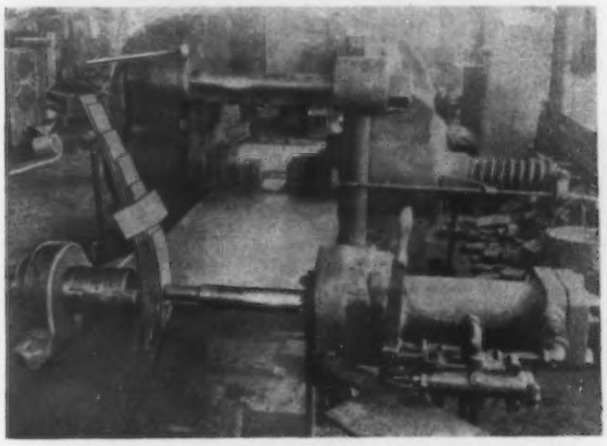
A 150-ton press used for bending butt strips and similar parts is shown in one illustration. Presses of this character are required for forming all parts to exact shapes and dimensions before the work of assembling and riveting the boiler is begun.

A heavy bar shear is used at the Baldwin Works for cutting cold steel up to 6 in. in diameter. The rigid, massive construction of this tool is typical of the best practice in the design of hydraulic machinery.

A 1400-ton flanging press and the 800-ton bending press, the latter illustrated, are examples of the more massive machines at the Baldwin Works. The bending press is used for forming corners on the sheets used for the tanks of tenders. The picture shows such a plate, suspended from slings, ready to be bent into shape on the press.

This press is designed with a deep gap which permits it to handle plates of any length and in widths as high as

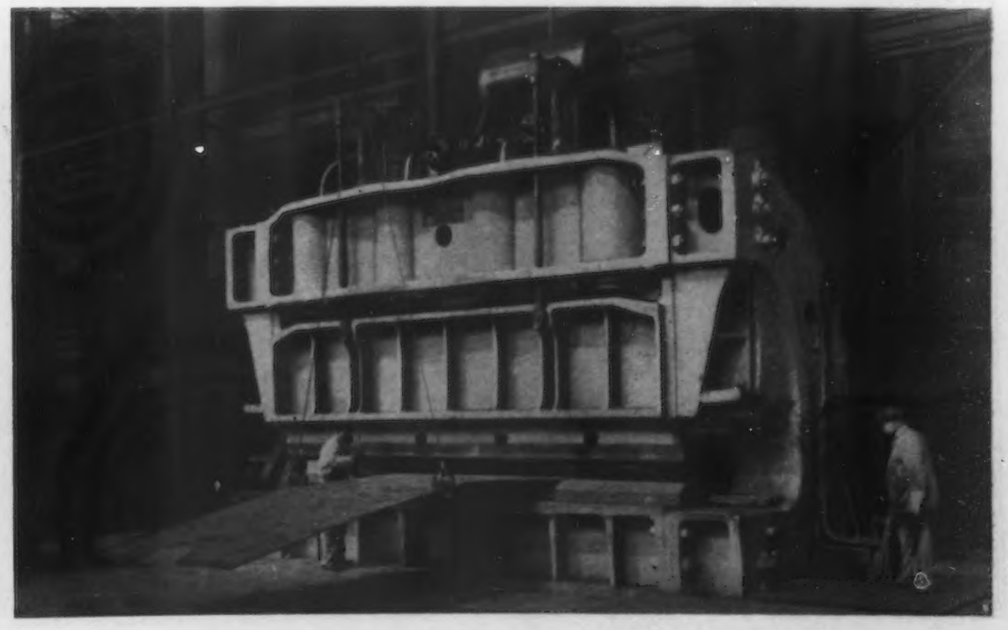


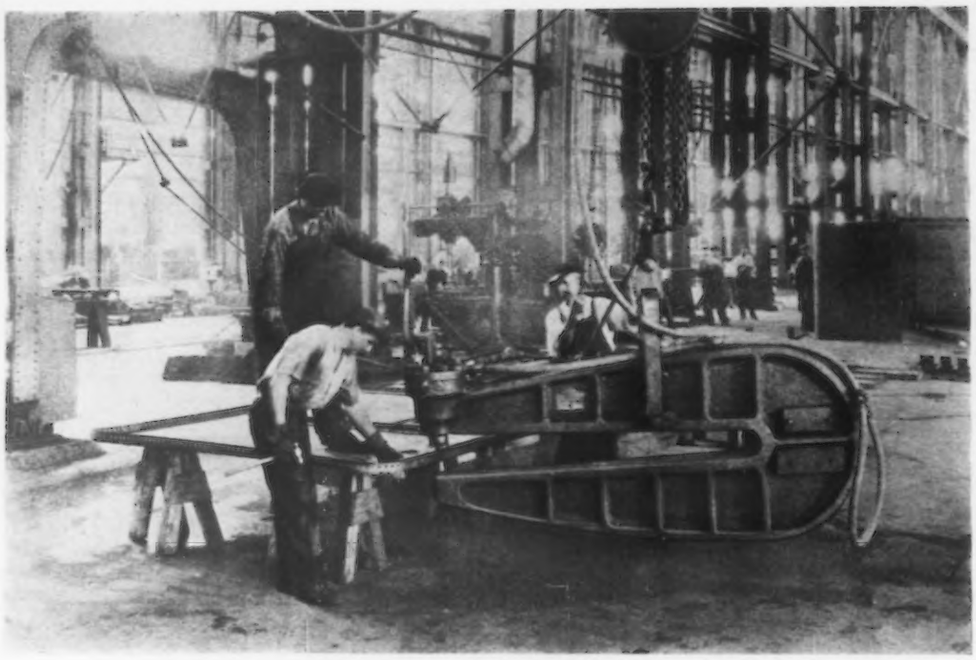


PRESSING Bushings into Locomotive Connecting Rods (Top) Requires Delicacy Rather Than Great Power

Applying Bands to Locomotive Springs. The next process, done on the press in rear, is to squeeze the band with pressure from four directions

BENDING Press of 800-Ton Capacity for Forming Corners on Tender Tank Plates. It can take a plate up to 18 ft. wide and has a 36-in. throat. The plate, as fed to the press, is suspended from a crane by slings





PORTABLE Hydraulic Riveter with Long Reach, Used for the Lighter Work. Suspended from a crane, this tool can be placed anywhere in the shop, as needed, taking power from a flexible hose

18 ft. Its throat is 36 in. Although it is very large, only two men are required to operate it—one man to guide the work and the other at the control station at the end of the press.

Hydraulic riveting plays a very important part in locomotive building. Two Southwark vertical riveters are shown, with unusually long stakes that permit them to handle boiler shells up to 22 ft. long. These particular riveters are especially designed with flush tops and the dies are arranged so as to permit driving rivets very close to the firebox sheet of the locomotive.

A smaller horizontal type of riveter is shown in another picture. In this view a steel angle bar is being riveted to the bottom plate of a tender tank, which is comparatively light work. This riveter has a long reach for driving rivets near the center of large sheets, as well as near the edges. It is suspended from a crane and is thus used as a portable tool. Hydraulic power is supplied to it through an armored hose, which can be attached to any convenient outlet from the high-pressure mains.

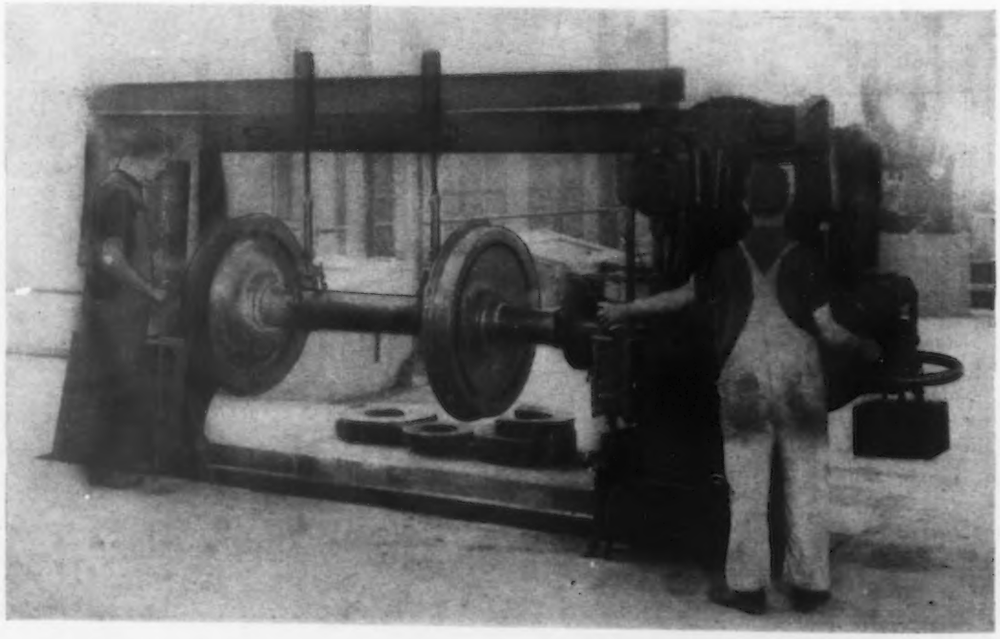
One operation is shown which is interesting because of its delicacy, and the extreme accuracy needed, rather than on account of the power required. A small pressing machine was especially designed for forcing brass bushings into locomotive connecting rods. It is served by a triplex motor-driven pump alongside.

Another forcing operation is shown in action on car wheels. This press is operated by a high-speed hydraulic pump with an electric motor drive, arranged as an integral part of the machine. It was especially designed by the Southwark Foundry & Machine Co. for forcing wheels on the axles of tenders.

The trend toward the use of special-purpose machines operated by hydraulic power is illustrated by another view which shows a multiple press built for the purpose of applying bands to locomotive springs at the Baldwin plant.

In the foreground, a sheaf of seven leaves is held together under high pressure while the band is slipped into place. After this operation, the spring and band are placed in the press seen in the background and the band is squeezed tightly on to the leaves. A pressure of 100 tons, applied simultaneously in four directions, is required for this operation.

HYDRAULIC Wheel Press with Integral Pump, Designed for Operation at Relatively High Speeds. Used for tender wheels, this machine has electric drive for its pump



Using Blast Furnace Gas for Heating

Its Employment in Steel Plant Furnaces Suggested by European Experience—Limiting Conditions Outlined

BY A. J. EBNER*

WHILE fuel economy will not be primary to the success of most of our plants [in utilizing blast furnace gas] for many years to come, there are good reasons nevertheless for each plant to plan a policy of progressive steps, in which changes in plant units will be determined either by the ease of accomplishment or the greater financial return on their cost. Most plants have no means for using excess blast furnace gas, aside from displacement of coal at the boiler house; and a sort of sixth sense tells us this is all wrong.

When a modern central power station produces a kilowatt-hour on one pound of coal, we realize that blast furnace gas in a boiler furnace is not in order. If blast furnace gas be elevated to a position in point of service on a par with producer gas, how would it pay in comparison to its use as boiler fuel? As an example, the set-up in Table I may be made to fit a general steel plant situation.

This indicates a two-to-one ratio in favor of firing blast furnace gas at heating furnaces, against use of the gas in generating surplus power. Similar determinations can be made for replacement of fuels in other departments, to find the relative scale of values. To indicate more clearly the difference between blast furnace gas and other gases commonly used as fuel in heating furnaces, Table II has been prepared.

Table II shows that a furnace burning blast furnace gas is required to handle greater quantities of gaseous products than are involved with the customary fuels. In addition, there is less total air required for combustion. Hence our problem in designing a suitable furnace for blast furnace gas use is quite different from conventional heating furnace practice.

Our conception of regeneration or recuperation has been to make the most effective use of our fuels in the hearth of the furnace, by allowing the flame and hot gases to sweep the entire length of the furnace, and to use in the checkers what heat is left. If we should pursue this practice in a blast furnace gas-fired furnace, it would be necessary to regenerate both gas and air. In view of the relatively high preheat temperatures required, this would indicate a short hearth to obtain higher end temperatures. A furnace handling greater quantities of gases and constructed with four checker chambers of large size will prove too expensive, in comparison with the simpler design customary with richer gas fuels.

Divisible Flame Type Used Abroad

Study of European progress in heating furnace design reveals that, contrary to American practice, they have for a long time been making use of regenerative reheating furnaces. The advent of the divisible flame type furnace as early as 1910 promoted the use of lean fuels with regeneration of both air and gas.

In this furnace a portion of the flame in the forehearth is withdrawn and made to pass alternately through one or more checker chambers, to preheat air or gas. The rest of the flame continues over the steel on the hearth and is discharged at low temperature direct to the stack. The principle is similar to that in bleeder-type steam turbines, wherein steam is bled at an intermediate stage in its expansion, and used in a regenerative heat cycle. Adoption of the divisible flame type furnace by European steel plants became quite general, and it is now in common use. Its advantage lies in securing high degrees of

*Freyn Engineering Co., Chicago. This is a paper, substantially in full, which was presented at the annual meeting of the Eastern States Blast Furnace and Coke Oven Association, at Pittsburgh, June 7.

TABLE I.—BLAST FURNACE GAS FOR BOILER OR HEATING FURNACE

Assume a fuel unit of 1000 c.f.m. of blast furnace gas.

	Use of Blast Furnace Gas	
	As Boiler Fuel	As Fuel for a Heating Furnace
Heating value—B.t.u. a minute	100,000	100,000
Product in electrical power—kw.	300	.....
Capacity for heating steel—gross tons steel an hour	.....	4
Cleanliness of gas—grains per cu. ft.	0.25	0.04
Cost of direct plant equipment for using gas	$30,000	$20,000
Cost of gas cleaning equipment	$1,000	$2,500
Total investment	$31,000	$22,500
Coal equivalent—lb. a minute	8	8
Cost of steam coal vs. gas coal	$3.50	$4.50
Value of gas per year	$7,250	$9,300
Fixed charges on investment at 13 per cent	$4,030	$2,920
Net revenue from gas	$3,220	$6,380

TABLE II.—COMPARATIVE COMBUSTION DATA FOR VARIOUS FUEL GASES

Based on 1,000,000 B.t.u. in fuel input to furnace.

	Coke Oven Gas	Producer Gas	Blast Furnace Gas
Heating value of gas—B.t.u. per cu. ft.*	500	150	100
Weight of gas—lb. per cu. ft.*	0.0307	0.0690	0.0812
Quantity of gas to liberate 1,000,000 B.t.u.—cu. ft.	2,000	6,667	10,000
Lb.	61.4	460	812
Lb. air per lb. gas for perfect combustion	10.86	1.45	0.6857
Total air required—lb.	667	667	558
Products of combustion per lb. of fuel gas—lb.	11.86	2.45	1.6857
Total products of combustion—lb.	728	1,127	1,370
Total products of combustion—cu. ft.*	7,520	12,350	15,200
Total products of combustion—cu. ft. at 3000 deg. Fahr., incl. H_2O	68,000	96,000	109,500
Relative volume of products of combustion	100	140	160

*At standard conditions.

preheat without undue sacrifices of heat available in the hearth for heating the steel.

With a lean gas, in the combustion of which large quantities of gaseous products are released, the division of the flame seems very desirable, from several viewpoints. By so doing, we can have a full release of heat in the combustion space, aiding in absorption of heat by radiation. By dividing the flow of gaseous products into two lanes, we can reduce the size of the furnace as far as gas velocities affect it. And the temperature of gases for heating checker brick, and also their quantity, may be controlled. The design and operation of such a furnace require careful consideration of the product to be heated, in establishing the proper proportion of gases in each division of travel.

During the period in which the divisible flame type of heating furnace was attaining its growth, the necessity for burning blast furnace gas in reheating furnaces became more and more insistent in European steel mills, particularly in Germany, France, Belgium and Luxemburg, as this gas had gradually been losing favor as fuel for gas engines and steam boilers. Mixed coke oven and blast furnace gas presented no great difficulty in its application as a furnace fuel. It was more a problem of transportation, metering and control of mixtures.

Use of mixed gases for heating furnaces now shows signs of losing ground, and a definite trend is evident in the increasing number of installations of furnaces burning blast furnace gas solely. The divisible flame furnace has given splendid results when designed for and fired by blast furnace gas. One furnace, according to a statement published in 1926, showed an hourly production of 40 tons in cold charge, fired by blast furnace gas of 95 B.t.u., and with a fuel consumption in equivalent coal of little over 5 per cent. This and other similar furnaces had four regenerative chambers, two each for gas and air, and while successfully demonstrating the divisible flame principle in connection with blast furnace gas firing, still had the disadvantage of requiring much space and being too costly in construction.

Air Regenerated to High Temperature

A furnace developed along lines suggested by the divisible flame type has been introduced in Germany by Friedrich Siemens A. G., Berlin. There are no gas regenerators, but the air is preheated to temperatures higher than heretofore possible. This is accomplished by separately burning blast furnace gas for heating the regenerator brickwork. The blast furnace gas by which the furnace hearth is fired is introduced through a row of nozzles distributed across the entire width of the furnace.

All the gas nozzles discharge in such manner as to aspirate highly preheated air, supplied by a cross flue connected at both ends to an individual regenerator. Hot air enters alternately from either regenerator into this flue, from where that volume of air, in excess of the requirements of the gas burned in the hearth, passes into the other regenerator. Preceding its entrance to this chamber, the air is supplied with blast furnace gas by auxiliary burners, whereby a flame is produced to heat the regenerator to a high degree.

On the cold end of the regenerator reversing valves permit reversal from gas to air at the required intervals. Thus the hearth of the furnace is supplied by a constant flow of gas and preheated air, uninterrupted by the operation of reversals in the regenerators, and the checkers are heated by gas fired separately, with air, also preheated.

Close Regulation of Temperature

Besides the lower cost to construct, the advantage of this furnace is in the close regulation of temperature made possible by the double firing system. The heat released to the hearth, being a function of fuel quantity and amount of preheat in the air, is responsive to changes in either of these variables, which in the case of the double-fired furnace is easily accomplished at either one or both sets of gas burners. Especially of advantage is the close control in maintaining the degree of air preheat, and the celerity that changes in preheat are made.

A Siemens double-fired heating furnace built in 1928 at Differdingen, Luxemburg, was tested after several months of operation to determine capacity and fuel consumption. The furnace was designed for heating blooms 6 in. x 6 in. x 8.5 ft., using blast furnace gas for fuel. Results of this test are given in Table III.

It is to be noted that the test runs were on blooms of 882 lb., measuring 6.3 x 6.3 in. x 79 in. long, or 2 ft. shorter than those for which the furnace was designed. Blooms were drawn at average temperatures of 2237 to 2282 deg. Fahr. With blooms for which the furnace was designed it was estimated that the average gas consumption would be 18,000 to 18,500 cu. ft. to the ton.

In any study to determine the most economical uses for blast furnace gas, many factors affect the problem differently in each case. There are differences due to location, value of coal, price of labor, and markets for sale of coke oven gas. Then there are differences in the make-up of the plants to be considered, such as the relative proportion of open-hearth and Bessemer production, the number of blast furnaces and out-of-blast periods when production of gas will be curtailed or cease entirely, and the availability of substitute fuels at such periods.

The most that can be said in a broad way gives every preference first to the stoves of the blast furnace in their requirement of gas; second, the coke ovens; then the steel plant furnaces, either mixed for melting and heating or alone for heating; lastly, to the boilers for production of power.

Table III—Production of Siemens Furnace and Consumption of Gas

Duration of Test						Blooms Drawn		Average Production per Hour, Gross Tons		Consumption of Gas, c.f.m.		Consumption, Cu. Ft. per Ton of Steel			
Total Time		Time Lost		Net Time				Actual	Corrected for Conditions of Guarantee.		Corrected for	For Total Time		For Net Time	
Hr.	Min.	Hr.	Min.	Hr.	Min.	No.	Gross Tons	Total Time of Test	Net Time of Test	Actual	Guarantee*	Actual	Corr.	Actual	Corr.
4	30	0	35	3	55	282	111	24.7	33.7	8,590	8,830	20,900	18,100	18,200	15,750
3	30	0	23	3	7	248	97.5	27.9	36.8	8,850	9,160	19,000	17,700	17,100	14,950
6	0	1	10	4	50	386	152	25.3	37.4	8,820	9,070	20,900	18,150	16,800	14,550
3	30	0	15	3	15	276	109	31.0	39.6	9,410	9,700	18,200	15,900	16,900	14,700
7	0	0	55	6	5	515	203	29.0	39.4	10,000	9,760	20,700	17,100	18,000	14,900
3	0	0	19	2	41	250	98.5	32.7	43.4	10,000	9,760	18,350	15,100	16,350	13,500
Average								28.5	38.4			19,675	17,000	17,200	14,725

*Refers to gas of 97 B.t.u. per cu. ft. at 62 deg. Fahr. and 30 in. Hg. The average actual pressure was 37.5 in. of water in the first four tests and 40 in the others; gas temperature was 77 deg. Fahr. in the first three, 78 in the fourth and 59 in the remaining two.

Cupola Operating Problems Discussed

British Exchange Paper at Foundrymen's Convention—Study of a 36-In. Cupola —Method Suggested to Ascertain Cupola's Thermal Efficiency

MELTING and composition of gray cast iron, and molds and cores were the two major topics of consideration in the annual exchange paper of the Institute of British Foundrymen at the recent annual convention of the American Foundrymen's Association in Chicago. The title was "Science Hand in Hand with Labor," and the author was Frank Hudson, Kilmarnock, Scotland. In his absence, the paper was read by O. Smalley, consulting metallurgist, New York.

The section of the paper that dealt with the melting and composition of gray cast iron laid special emphasis on the analysis of the iron mixture most suited to the castings to be produced. A table was presented that gave specifications for various gray iron mixtures, the types of castings for which these mixtures are best adapted, and typical applications as to the form necessary and the service required of the castings. Stress was placed on the subject of the blast through the accurate control of volume of air, and close check on pressure.

AS chief metallurgist with Glenfield & Kennedy, Kilmarnock, Scotland, Frank Hudson wrote the exchange paper for presentation at the American foundrymen's convention this spring in Chicago

Acknowledgment was made that control of total carbon in the iron foundry is a difficult matter. But it is likely to become of extreme future importance in the development of high-test material. For general high-duty castings, using various quantities of steel in the mixture and giving a minimum of 3 per cent total carbon after melting, the aim should be to have a correct amount of air to combine with the coke to give a neutral or very slightly oxidizing atmosphere. The lower the blast pressure consistent with correct volume, the hotter is the metal obtained, due to a lower melting zone and hotter hearth.

Other papers, not reviewed in the report of the convention in THE IRON AGE of April 18, are abstracted in the following paragraphs.

Eighteen Weeks Study of a Large Cupola

RESULTS of 18 weeks of study, during which 45 heats were run, were reported in a paper entitled "Study of a 36-In. Cupola," by F. B. Coyle, research metallurgist, International Nickel Co., Bayonne, N. J. Impressions gained by the author in this work were:

> Addition of limestone to metal charges increases the temperature of the metal cast from the cupola.
>
> Carbon and silicon decrease as the heat progresses, although all metal and fuel charges remain the same.
>
> The temperature of the metal cast from the cupola increases as it progresses.
>
> Sulphur is low during periods of slagging off and is high when slag accumulates.
>
> Strength and hardness of the metal cast from the first ladle are lower than obtained from metal from succeeding ladles of the same heat.

Analysis of the data collected indicated that the 24-in. bed gave the highest temperatures and the best strengths. Increase in blast pressure raised the iron temperatures and lowered the total carbon. Charts given indicated that the higher the melting temperature the stronger the iron within the range studied. Analysis of heat No. 35 showed that it is possible for a layer of slag to act as a cover and prevent loss of silicon and manganese. However, it was noted that during all heats in which much slag accumulated there was much variation in tensile strength and Brinell hardness.

Conclusions reached by the author are that by careful analysis and the control of cupola operation it is possible to improve the tensile strength nearly 30 per cent, or from 28,000 to 30,000 lb. to a range of 37,000 to 40,000 lb. per sq. in., and maintain the Brinell hardness between 200 and 220. Besides the quality of the metal was improved to such an extent that a shelf stock of the spare Diesel parts for submarine service was reduced to one-third the previous amount because of longer service obtained in operation.

How to Determine Thermal Efficiency of Cupolas

A METHOD for determining the thermal efficiency of the cupola was outlined in a paper by Edward E. Marbaker, director division of foundry research, Whiting Corporation, Harvey, Ill. This calculation can easily be made from two factors, (1) the weight of coke consumed per ton of metal produced, and (2) the temperature of the metal at the spout. The carbon content of coke must also be known and the weight of coke reduced to weight of carbon.

In the same paper there were also reported tabulations of a questionnaire sent to 136 representative foundries operating cupolas. Some cupolas are lined straight and others are contracted in diameter from some point below the charging doors to the top of the tuyeres. The latter are said to be boshed at the melting zone. The data were divided between the straight-line and the boshed type of cupola. Relative to the boshed cupola it was found that in all cases the melting zone lies within the bosh, and that the bosh lining decreases the normal melting rate to that of a cupola straight-lined to the minimum diameter of the bosh. The author held the opinion that the presence of a bosh is advantageous from the standpoint of combustion conditions, which would have a bearing on the melting rate.

The data on the amount of bed coke used showed great variation—from 1200 lb. to 4500 lb. in the case of a straight-line cupola and from 950 lb. to 2650 lb. in the case of the boshed cupolas. Melting ratios, pounds of iron melted per pound of carbon consumed, varied from 7 to 9.30 in the straight-line cupolas and from 7.15 to 9.26 in the boshed cupolas. The average blast pressure in the straight-line cupolas was 13.5 oz. and for the boshed type it was 11.4 oz.

In the discussion which followed, J. D. Stoddard, Detroit Testing Laboratories, stated that increases in sul-

phur content are to be expected from higher percentages of remelt, unless cupola practices are changed. J. T. MacKenzie told of experiments using various sizes of scrap material, wherein general practice and mixtures were otherwise the same. When 1¾-in. bars were charged, the tapped metal contained 0.06 per cent sulphur. Rods ¾ in. in diameter brought a result of 0.09 per cent sulphur, whereas the poured metal using ⅛-in. strip showed 0.12 per cent sulphur. Doctor Moldenke stated that the order depended largely on the section of scrap used. The temperature for melting steel is high, whereas the rate of heat absorption by pig iron is low. Thin steel can go higher up in the charge.

Gray iron foundries are not alone concerned with competition within the industry, but also with that strife wherein one industry is matched against another in the substitution of materials. Stress was laid on this situation and the need for uniform trade customs by A. J. Tuscany, secretary of the Gray Iron Institute, at a luncheon meeting. He further showed that from 1901 to 1925 pig iron consumption has increased 130 per cent; population has increased 46 per cent; the use of pig iron per capita has gained by 262 lb.; the consumption of steel castings has grown by 10.7 lb. per capita. But in this span of time the per capita use of gray iron has shrunk by 15 per cent.

Value of Luminosity in Gas for Heating

THERE exists a considerable divergence of opinion both as to the value for metallurgical combustion derived from luminosity in the flame and as to the cause of such luminosity, according to A. G. Witting, in a report before the Association of Iron and Steel Electrical Engineers, at Pittsburgh, on June 19. As we with this word mean radiance of the flame or the power of radiation developed in combustion, the question in dispute can also be expressed thus: "Is it principally through radiation or through convection that the transfer of heat from the flame to the metal takes place?" In propounding this question in this manner, we also restrict ourselves to its application to an open-hearth furnace.

The once generally accepted theory that, at least after the melting down period, the heat in the flame is mostly transmitted to the bath through radiation, partly directly, partly by reflection from the furnace roof, and that the radiation was due to the presence of incandescent carbon particles in the flame, has of late been severely attacked.

Controverts Radiation Theory

Among others, the following facts were brought forth as arguments against the radiation theory:

1. The best heating efficiency is obtained by a long flame, sweeping closely over and brought in contact with the bath, which becomes inactive where the flame ends. But, as radiation is proportional to the fourth power of the absolute temperature of the flame, a concentration of combustion, i.e., the shortest possible flame, should give the highest temperature and, consequently, the greatest radiating power.

2. It has been contended that an important part in the transmission of heat was taken by the furnace walls and particularly the roof, which radiated downward to the bath heat absorbed from the flame, also acting as a mirror reflecting the luminant heat of the flame. Against this assumption it was pointed out that, with a good working furnace, the temperature of the roof is lower than the temperature of the surface of the bath and that, consequently, no heat transfer between the two surfaces can take place.

3. Figures have been produced to show that the radiating power of CO_2 and H_2O is considerable and that at a temperature of 1500 deg. Fahr. it already exceeds the convective power of the gases. But as CO_2 and H_2O are the final products of combustion, their power would be greatest when combustion is completed, i.e., beyond the flame proper. This theory is apparently contradicted by practical experience, which shows that the action on the bath ceases with the flame.

Convection Has High Value

Recent studies made in Germany over the phenomenon of heat transmission in an open-hearth furnace, and summarized in a paper by Dr. E. Herzog, seem to have vindicated to a large extent the original theory that the transfer of heat is mainly performed through radiation, although it is admitted that convection is of greater importance than once considered. It was pointed out that the products of combustion, developing principally on the outside of the flame, form layers of inert gas between the flame and the roof, which have a considerable power to absorb radiation and lessen the heat transfer to the roof.

Similarly, layers of combustion products between the flame and the bath prevent not only heat transfer by convection, but also by radiation. Furthermore, experiments have shown that the ratio of heat transmission is proportional to the distance. Consequently, the transmission of heat through radiation requires also that the flame sweep as closely as possible over the bath.

It has also been proved by calculation that, in assuming a heat transmission mainly through convection, it will be necessary to give the coefficient of transfer a much higher value than any experiments warrant. Considering that the plus pressure which forces the gas and air into the furnace and controls their speed and direction, gradually changes into a negative pressure caused by the stack draft or exhaust fan, the end of the visible flame or completion of combustion will approximately coincide with the zero point where the draft pulls the gases away from the bath up toward the ports.

Both Radiation and Convection Are Effective

Add to this that the flame temperature is gradually lowered as the combustion proceeds to completion, and that the capacity of radiation is proportional to the fourth power of the absolute temperature, and it appears that the heat transfer through radiation from the CO_2 and H_2O gases in the products of combustion can be only a fraction of the radiation from the actual flame, and insufficient to cause the bath to boil.

This short résumé of the principal arguments for and against the greater importance of heat transmission through radiation or convection may prove the right to draw the conclusion that the heat is transferred both ways.

During the melting-down period, when the piled-up scrap offers a great obstruction to the flame, causing a considerable turbulence, a condition that greatly increases the power of convection, and when the scrap also presents a very large surface for direct contact, the heat transfer is predominantly carried on through convection. But after the slag blanket has been formed, the heat transfer through convection is greatly diminished and radiation is depended on.

Making steel picks for mining and other digging from chrom-molybdenum steel is one of the new operations of a steel tool company in Wheeling, W. Va. It is claimed that they are lighter and stronger and wear longer than picks made of carbon steel.

Sheet Steel Fabricated at Low Cost

Intensive Use of Mechanical Conveyors Has Saved Floor Space and Brought Other Economies at New Graham-Paige Body Plant

TO meet the need for an increased number of bodies for Graham-Paige automobiles, the Graham-Paige Body Corporation, Detroit, has recently added to its facilities a new plant at Evansville, Ind., which has a capacity of 350 units a day. In its construction the plant embodies the latest methods for simplifying production and for handling materials mechanically. While some features resemble those in other factories making a similar product, there are many innovations which contribute directly to low operating costs.

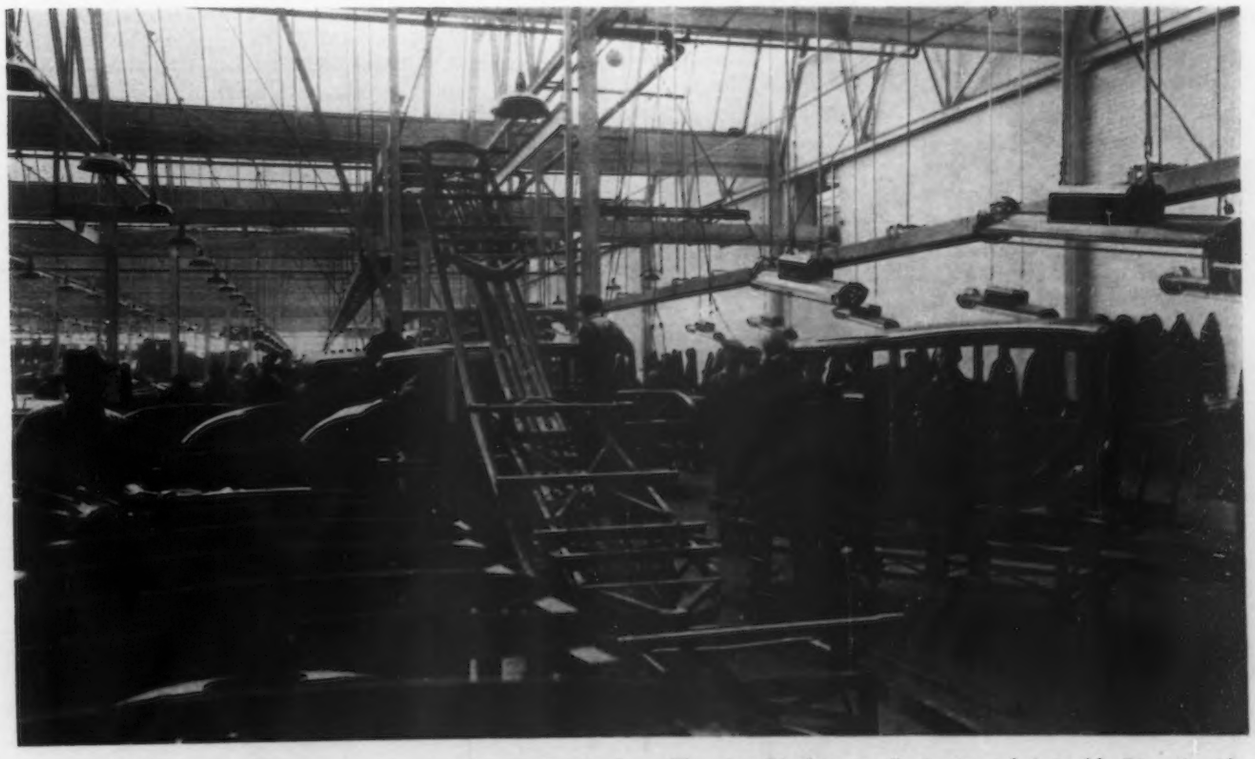
With the entire plant on one floor, the danger of damaging bodies or body parts in transit from one floor to another has been eliminated. Floor space has been conserved in every possible way. Assembly operations, for instance, are carried on along a series of parallel conveyor lines running the length of the factory. Bodies start down the first line and move back along the second line, keeping up the back-and-forth movement until they reach the end of the last line, where they undergo final inspection before being shipped.

These parallel assembly lines are arranged in such proximity that no waste space is permitted, and yet workmen have enough room in which to move about comfortably. The floor area for manufacturing purposes has been kept within restricted bounds by the overhead transportation of materials wherever possible. For example, cushions travel on an overhead monorail conveyor from the upholstery department at the front end of the building down one side of the trim line and up the other side, the conveyor returning to the upholstery department, where it begins the repetition of the journey.

Bodies moving along the assembly lines are carried through all operations on a single type of truck or "dolly," mounted on four swivel casters which run in a steel channel track. When bodies reach the shipping platform and are placed in railroad freight cars for shipment to Detroit, the empty trucks are returned on an overhead conveyor to the beginning of the assembly line.

There is a continuous flow of materials from the west to the east end of the plant. Paralleling the west wall, just within the building, is the receiving platform and a depressed track with a capacity of 10 railroad freight cars. From this point the material moves, without backtracking, through the assembly operations to the shipping platform at the east end of the plant, where the arrangement is similar to that at the west end.

By agreement with the Wabash Railroad, the company has set aside for its service a number of box cars which take finished bodies from Evansville to the Graham-Paige automobile plant at Detroit and bring back sheet metal for bodies to the Evansville factory. The interior of the box cars is arranged to accommodate two tiers of sedans



USE of Overhead Conveyor for Returning Empty Trucks from Shipping Platform to Beginning of Assembly Line Avoids Wheeling Trucks Through Production Lines and Provides Small Supply of Trucks for Main Assembly Line

or three of touring cars. In this way 14 sedan bodies or 20 touring car bodies can be shipped in each car.

The first main assembly line is fed by sub-assembly lines running at right angles to it, this method being common practice in practically all plants in the automobile industry operating on mass production. Adjacent to the receiving platform at the north end of the factory is a lumber mill, in which various wooden parts for the framework of the bodies are made. Just south of the lumber mill, the sub-assembly work begins. It is here that the rear door, front door, back seat frame, rear seat frame, underbody and the rear of the coach are assembled.

Progressing toward the main assembly line, the rear light frame, rear quarter frame and underbody frame are successively added. At the latter point the work reaches the framing jigs, of which there are four, one for the coach and three for the sedan models. In these specially designed jigs the body frame is assembled. After assembly, the frame is placed on a truck or "dolly," ready to begin its journey along the main assembly lines.

The back and the rear quarter assemblies are transported on hand trucks from the receiving platform to temporary storage, from which they are taken to sub-assembly lines for finishing operations. These include finishing butt-welding of seams and finish grinding and buffing.

Body assembly conveyors consist of six separate lines, having a total length of approximately 7000 ft. As it progresses along assembly conveyor 1, the wooden body frame, mounted on a truck or "dolly," receives its priming coat of paint in a slushing booth and is dried in an oven at a temperature of 210 deg. Fahr. After this operation, the metal panels are assembled and the doors are hung. This

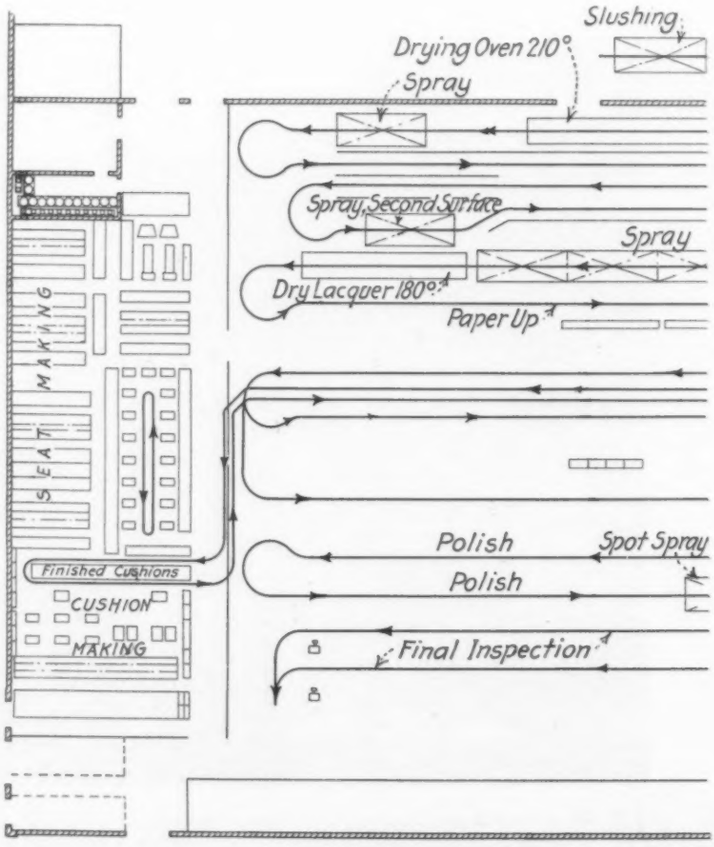
BACK and Rear Quarter Assemblies, Shipped from Detroit, Pass Through Finishing Operations Before Reaching Main Assembly Line (Top of this page)

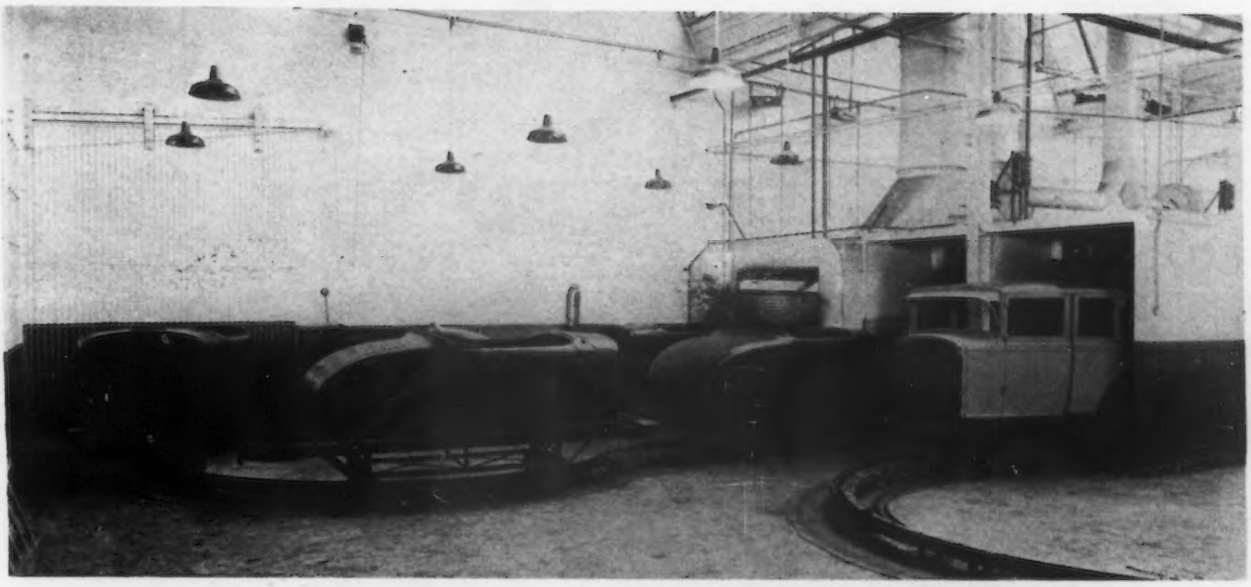
* * *

ASSEMBLY Conveyor 2 (top of next page) Consists of Eight Parallel Lines with Connecting Loops at Each End So That Travel of Bodies Is Continuous from One End of Conveyor to Other. Conveyor is a single continuous chain of forged rivetless type, which is guided around end loops by a series of ball bearings

* * *

AVOIDING Most of the Detail, the Diagram on This Page and the Next Traces the Continuous Series of Loops Up and Down the Length of the Plant (the Building Is 570 Ft. Long). Empty truck conveyors are then sent back overhead, directly across the floor tracks, to start again



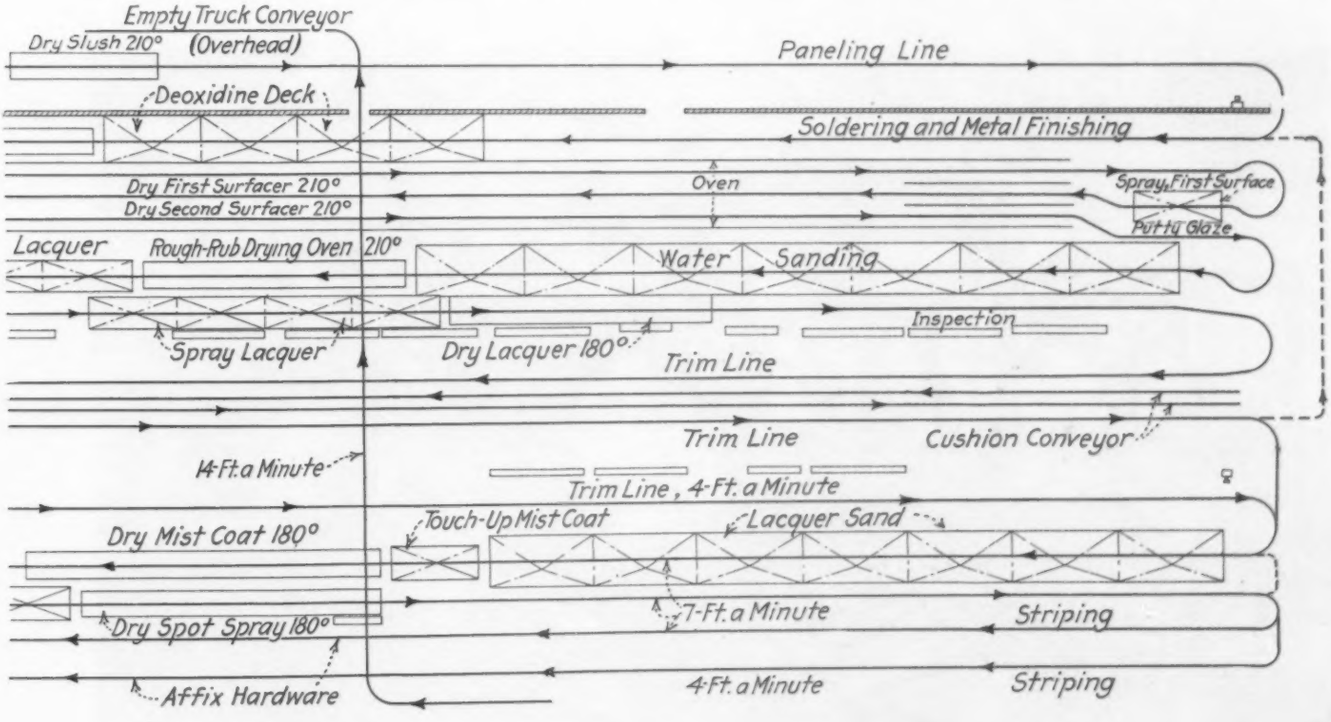


conveyor, moving at the rate of 7 ft. a minute, is 385 ft. long and utilizes a standard combination chain operating flat in a double channel track, and fitted with pusher dogs at intervals of 13 ft.

When the bodies reach the end of conveyor 1 they are pushed by hand to the starting point of conveyor 2, nearby, which carries them through all cleaning, undercoat and sanding operations, delivering them ready for the lacquer coats. Slightly over 4100 ft. long, this conveyor consists of eight parallel lines with connecting loops at each end, so that travel of the bodies is continuous from one end of the conveyor to the other, no manual labor being required for the transfer from one line to the next. The conveyor is a single, continuous chain of the forged rivetless type, with vertical pins, operating in a double-angle track. Hinged pusher dogs are fitted on 13-ft. centers. The chain is guided around the end loops or turns by means of a series of ball-bearing rollers.

Along conveyor 3, of straight-line construction, bodies are touched up or repaired before they are lacquered. Conveyor 4 is similar in design to conveyor 2. It has one loop and is 1000 ft. long. It serves the "lacquer line," where three coats of lacquer are sprayed on the bodies, which then are dried in ovens, rubbed out and polished. The last two lines, conveyors 5 and 6 respectively, are each 470 ft. long and are used for trim and final assembly work.

The overhead conveyor, by means of which empty trucks are returned from the shipping platform to the beginning of the main assembly line, is suspended from the roof trusses. Its general design is the same as that of conveyors 2 and 4, except that the empty return chain



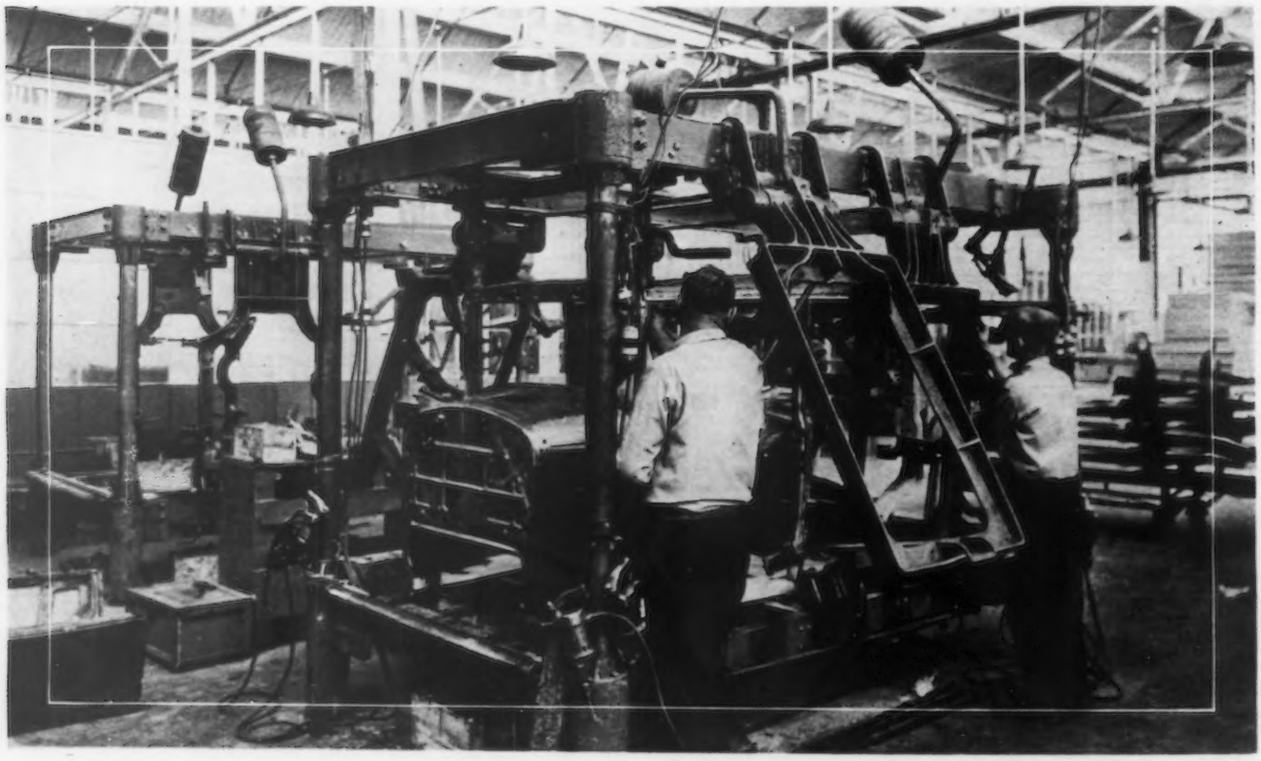
Metal Panels Are Assembled and Doors Are Hung Toward End of Assembly Conveyor 1

runs parallel and adjacent to the load chain, and the trucks and chain track are suspended from overhead instead of being laid on the floor. The use of this conveyor avoids the necessity of wheeling empty trucks through the production lines and provides a small supply of empty trucks for the main assembly lines.

At the end loops or turns, on conveyors 2 and 4 and on the empty truck conveyor, the "dolly" track consists of channels bent to the proper curve. The chain, however, must be supported against side thrust or pull. This is accomplished by running it over a series of rollers mounted on ball bearings and carried in brackets or frames securely anchored to the floor.

Cushions and other trim materials are carried on a "monoveyor" (monorail conveyor) consisting of a 4-in. I-beam track on which two-wheel ball-bearing trolleys operate. Attached to the trolleys at intervals of about 3 ft. is a continuous steel forged chain driven from a central point. The I-beam track can be curved up or down and turned in a horizontal plane as required. It is suspended from building trusses at a height to provide head room underneath and is brought low at certain points for loading or unloading purposes. Each alternate trolley carries a tray into which cushions or other materials are loaded.

All conveyors are driven by constant speed, 1200



Body Frame Is Assembled in Specially Designed Jigs

r.p.m., a.c. motors, through silent chain to a variable-speed transmission. Straight conveyors Nos. 1, 3, 5 and 6 are equipped with standard Mechanical Handling Systems style A unit drives, consisting of a 2-hp. motor, silent chain to variable-speed transmission, roller chain to spur gear reducer, and roller chain final drive with shear pins to conveyor head shaft. The entire unit is mounted on a single cast iron base.

Caterpillar Drive Used

Curved conveyors 2 and 4 and the return track line are operated by caterpillar drives. Conveyor 2 has four separate drives driven from a single motor, variable-speed transmission and a countershaft located under the floor. Speeds in all cases are controlled by means of a variable-speed transmission, the maximum speed being five times the minimum.

Main considerations in designing and in installing the conveyors were: 1. Proper room and time for each operation. 2. Minimum possible floor space. 3. Least manual labor in carrying bodies from one line to another. 4. Flexibility of layout to provide for possible future changes in paint specifications. 5. Provisions to insure least possibility of shutdown of conveyors.

Thoroughly Ventilated Spray Booths

Spray booths are of the syphon ventilated tunnel type, manufactured by the Newcomb-David Co., Inc., Detroit. Fans are removed from the exhaust line, so that sparks from the motor or fan cannot come in contact with either the contents of the room or the spray booths. Automatic dampers controlled by electricity close the stacks of the booths when the system is not in operation, thus preventing heat losses through excessive escape of air from the room in winter months. In case of fire, drafts are closed automatically by turning off the fans. Booths are made of heavy galvanized sheet metal on steel angles, to withstand hard usage.

Drying ovens consist of eight units as follows: One dry slush oven, one dry-off oven, one surface oven, three lacquer ovens, one mist-coat drying oven, and one dry spot oven. The dry-off oven and the surface oven are each 408 ft. long, but the other ovens are each 75 ft. long and the steam ducts are 65 ft. long inside the oven. Ovens are steam heated with steam pressure of 80 lb. by means of steam coils on the roof. The air is forced through the coils by American Blower Co. fans. With the exception of the dry-spot oven, which is kept at 180 deg. Fahr., all ovens are heated to 200 deg. Fahr.

Small parts and supplies are carried from the receiving platform to the stockroom or to any desired point in the factory on gasoline tractor trucks, built by the Clark Tructractor Co., Battle Creek, Mich. For transporting small parts within departments a large number of hand trucks, manufactured by the Towsley Mfg. Co., Cincinnati, are used. The plant is lighted by the Cooper-Hewitt system. The entire conveyor system was designed and installed by Mechanical Handling Systems, Inc., Detroit. The Hoffman Construction Co., Evansville, built the plant, and the frabricated steel was furnished by the International Steel & Iron Co., Evansville.

CUSHIONS and Other Trim Materials Are Carried to Assembly Lines on a Monorail Conveyor. A large area devoted to seat and cushion making will be noted at the left end of the diagram appearing on a previous page

Building Code Permits Welding

A committee of the American Welding Society has formulated a brief code for fusion welding and gas cutting in building construction, in response to a demand for authoritative information of this nature, and the code has already been adopted by a number of cities, especially in the Pacific States. It permits the following unit stresses:

	Lb. per Sq. In.
Shear on minimum section through weld.	11,300
Tension	13,000
Compression	15,000

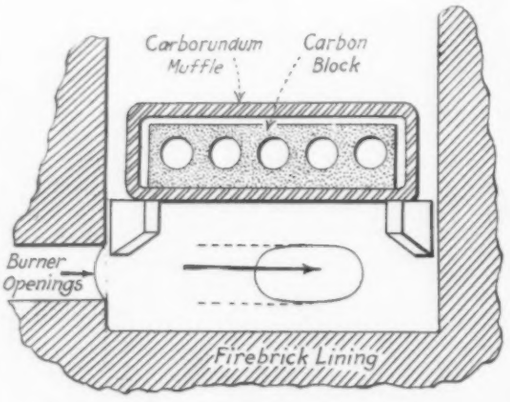
Adequate provision for eccentric stresses is required. As to workmanship, the code specifies: "Contractors for welded structures shall be required to satisfy the Superintendent of Buildings as to their ability to produce satisfactory welded joints." Gas cutting on members is not to be permitted while they are carrying stress.

Carbon Block Controls Furnace Atmosphere

Small Taps Hardened in Special Muffle Come Out True to Size, Without Scale Other Than Slight Surface Discoloration

HARDENING of high-speed steel requires such high temperatures that the tool at the end is usually badly scaled or blistered, sometimes even having soft decarbonized spots on the metal. Consequently the tool room commonly works to a definite oversize and expects to grind the part to the correct dimensions, thus removing the defective surface.

Such a plan is costly, if not impossible, in tools of intricate shape, such as taps, dies, hobs and chasers of small dimensions. Much ingenuity and skill have been expended on the problem of heat treating such fine cutting tools to a uniformly hard, scale-free surface. A new method of getting a neutral atmosphere has been developed and is in routine quantity production on high speed taps at the plant of the Winter Brothers Co., Wrentham, Mass. It has proved so satisfactory that the essential device, known as the "Diamond Block," is being marketed by the Sentry Co., furnace manufacturer, Taunton, Mass.



Sketch of Gas Furnace, Carborundum Muffle, and Carbon Block

The Winter Brothers Co., since its organization in 1902, had used two principal methods of heat-treatment, together with a number of minor variations, before hitting upon the diamond block method for taps and other thread cutters. For many years principal reliance was placed on the gas-fired muffle. After gradual development the furnace finally developed for tools up to ½ in. or ¾ in. diameter consisted of two muffles about 12 in. deep, 6 in. wide, and 4 in. high, one placed a little above another in a round steel shell. The furnace casing was brick lined, and had a vent at the top. The upper muffle was for preheat, the lower for high heat, being set just above the burners.

If such a furnace were operated with a considerable excess of gas (giving what is colloquially called a "wet flame") a skillful hardener, by regulating the time at heat, could get out the work with a uniform scale of fairly constant thickness. This was allowed for in the original machining; that is to say, the tools would be made 0.002 in. oversize. The correct diameter would remain after the teeth had been wire-brushed and the flutes ground.

The principal difficulty with this scheme is that such work is not sufficiently uniform nor precise. If the furnace atmosphere were a little too "sharp," if the temperature a little too high, or the tools were left at the high heat a little too long, a little too much scale would form, and the whole lot of taps would come out undersized and ruined. Opposite conditions might cause a slightly thin scale; then the costly expedient of lapping the taps down to size would be necessary.

Electric furnace atmospheres proved equally difficult to control so the tools would not scale or blister unduly, even when a curtain of gas was burned in front of the door to prevent inrush of oxygen from the atmosphere.

A good salt bath will cure the scaling trouble, but all the hot salts used in the hardening room at Winter Brothers Co. have attacked the container rapidly. After considerable experimentation, it was found that a pot pressed out of soft steel plate (which was renewed daily because of corrosion at the surface of the melt) cost the least per hour operated. But this plan involved considerable extra labor to change the pot daily and to clean out its valuable contents.

The final solution is shown in the accompanying sketch. The lower muffle of the high-speed gas furnace was replaced with a thin-walled carborundum muffle, slightly larger in inside dimension than a rectangular block of carbon. (This diamond block, so called, is said to be processed in a special manner, although it has the appearance of fine-grained, dense, electrode carbon.) In the block are drilled a number of holes from front to back, ½ to 2 in. diameter, depending on the size of the tools to be treated. The furnace flame, with slight excess of gas, is operated so that the round chambers in the carbon block are at the correct quenching temperature.

Quenching and Annealing Practice

The taps are loaded, without preheating, one to a hole, with a long narrow spoon, left about 3 min. to come to quenching temperature, then spooned out and dropped into an oil tank immediately in front. It will be seen that a 5-hole block will harden about 75 small taps per hour.

Some carbon blocks stick to the hot metal. This fault is cured by putting a trough made of thin nickel strip into each hole for a bottom liner.

After a lot of tools have been quenched, the basket containing them is lifted from the oil, drained, and the contents are ready to be drawn. About a dozen taps are ranged side by side in a fixture (a square block with corrugated surface) and the protruding shanks gripped by special tongs with appropriately shaped jaws. The device then is hung by its handle so the correct length of threaded tap is immersed into the salt bath; in about 2 min. the tongs are removed, opened over an oil bath, and all the contents drop into the tank for a quick cool.

The life of the blocks is about 27 hr. in a gas furnace and two-thirds as long in one heated by metallic electric resistors. They oxidize very slowly, and thus preserve a strictly neutral atmosphere about the hot tool. For this reason the metal comes out with a bluish tint, but this surface film is so thin that no allowance need be made for it in precision tools. The cost of the carbon blocks per tap hardened works out less than the pot for salt bath plus make-up salt; the expense over an open muffle is less than that of scrapping or lapping a lot of off-sized tools.

Demand and Production Balanced

But Signs Point to a Slackening of Both and to Moderate Price Recession—No Drastic Changes Anticipated

BY DR. LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

FOR the first time since April, 1928, when steel production temporarily over-ran the indicated requirements of consuming industries, it now appears that the output of the steel makers is again up to the demand ceiling.

Consumption and Production About Equal

ALL along we have pointed out that, in spite of high production, there has been no excess of steel making, because the activity of the chief consuming industries has been so great that their requirements have been above normal. In May, however, while the ingot output reached a new high record rate, the indicated requirements of the chief steel consuming industries are estimated to have barely attained the April level. The consumption was very large, but, as estimated, not quite so large as steel production.

The excess of the latter, however, was small. There have been periods in which production ran above the composite demand line for several months, and this may be another one. It can only be said that the conditions illustrated in the first chart have more of the appearance of a "high" than has been the case at any time since 1923.

On the one hand, the average daily ingot output rose sharply to a point 36 per cent above normal. On the other hand, the composite demand line remained about unchanged. Railroad traffic increased, and railroad equipment buying was good. Machine tool orders were sustained at a high level. Farm machinery production continued active, with no effects of the decline in grain prices yet apparent. But building contracts fell off, and a decline in automobile production occurred that considerably exceeded seasonal proportion; and so important are these two industries as steel consumers that the total level of steel requirements was doubtless affected.

Prospects are that the demand for steel will show a moderate decline, but that it will continue good. Demand from automobile manufacturers, general manufacturing industries and railroads seems likely to remain large. Even in the case of building, mining and farming, there is little reason to doubt a continued fair volume of steel requirements. But the recession in building activity and the more than seasonal decline in automobile production, together with indications of some let-down in general industrial activity, make it probable that the present high rate of steel production will have to be moderated before long to an extent greater than usual for the season.

Decline in Building Is More Pronounced

BUILDING activity, after a little spurt in April, resumed its downward trend in May, the decline in that month being greater than usual. Our adjusted index of contracts awarded, based on the average for 1921-1927 as 100, was 110, which compares with 112 in April and 129 in May, 1928. The trend has clearly been downward since October last year, when the adjusted index was 134. Every month of 1929 has fallen behind the same month in 1928, and the total for five months is 13 per cent behind last year.

This is the more remarkable in that occasional heavy items of construction continue to crop out and to sustain the orders for structural steel at a high level. It is to be remembered that the latter are partly due to the demands for railroad equipment and other non-building uses. Moreover, such items as subways do not arise from business considerations (though they are doubtless influenced by the bond market) and are initiated from political and other non-commercial considerations.

The decline in contracts is emphasized by the extraordinarily sharp slump in building permits in May. These fell more than 45 per cent from April and were over 20 per cent below a year ago. Considering the season, permits are at the lowest level since 1923. This more-than-seasonal slump in the plans for residences, stores and office buildings must be considered as an unfavorable indication. [But $217,000,000 of the slump occurred in the city of New York, a rush of plans in March and April having anticipated new multiple-dwellings legislation. EDITOR.]

Estimated total bookings of structural steel in April (338,800 tons) were lower than in March, though April is often the peak month of the year. The volume of structural steel orders is still very high and much above the same periods of recent years. It is unusual, however, for April business to fall below March, and the decline in contracts and permits in May was such that it seems hardly probable that structural steel can escape the declining trend much longer. Some decrease in May figures is to be expected, as the average weekly lettings, according to trade reports, fell somewhat behind the showing made in April.

This May Be the Peak of the Cycle

WITHIN the steel industry we find production and unfilled orders increased and prices steady and firm—such is the reading of the steel chart in May.

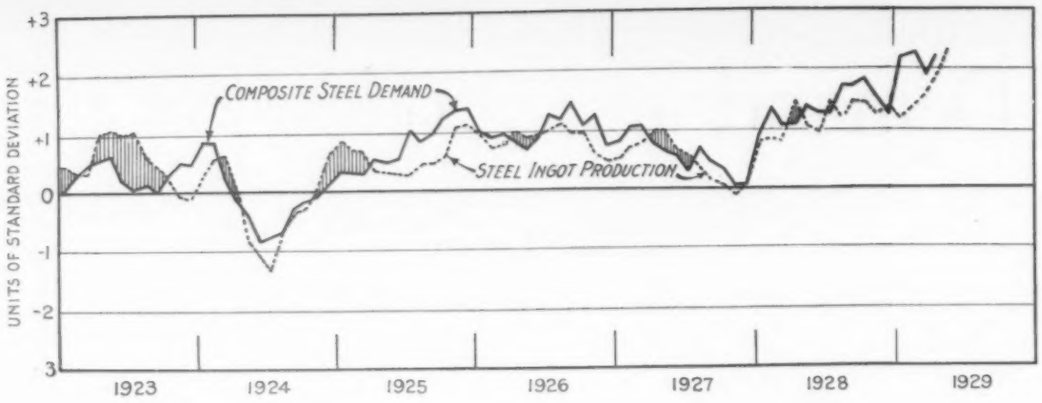
Those who have followed the course of the industry for years will naturally conclude that it is now only a question of time before some let-down will occur. How long this time may be is admittedly uncertain, and, under the circumstances, it is natural to look backward for some suggestion. When we do this, we find that the only periods in recent years of which it could be said that steel production was high and rising, that unfilled orders were increasing, and that finished steel prices were steady, were in May, 1923, and in December, 1925. *Both of these periods were near the peaks of business cycles in the steel industry.*

Neither period, however, was followed by immediate recession. Moreover, May, 1923, was different from May, 1929, in that unfilled orders were then very high and steel prices a little inflated. In 1925-1926, the industry was as free from inflation as at present and steel production and prices held up well most of the ensuing year. These precedents, therefore, while they suggest that the industry is at or very near peak levels and that some recession is probable before fall, do not suggest any bad break.

Briefly, the chief points in our statistical analysis are as follows:

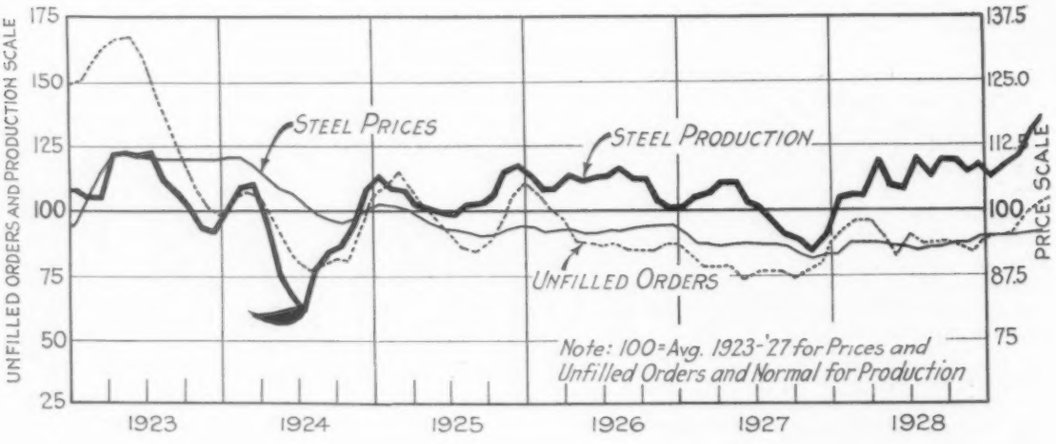
(1) The average daily ingot output in May increased about 2½ per cent, even after allowing for normal growth. Usually a seasonal de-

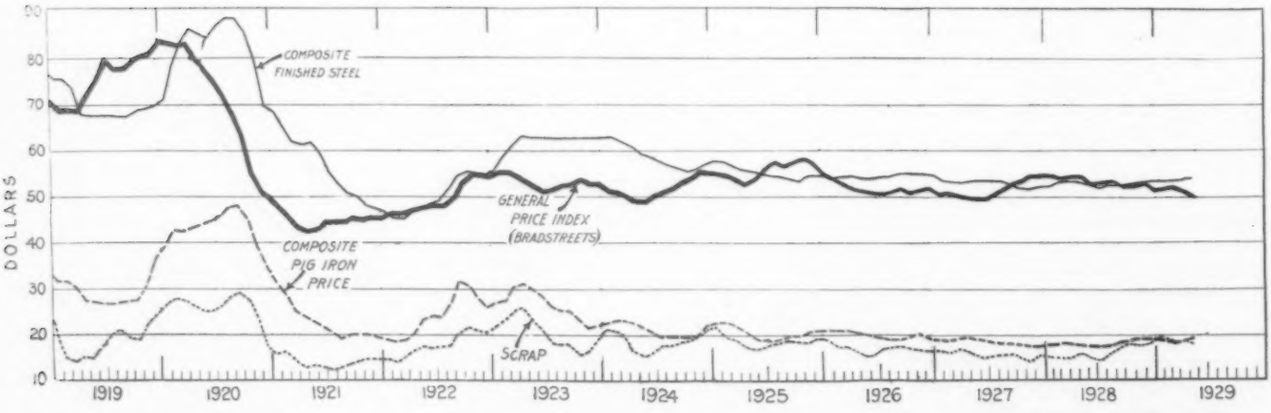
COMPOSITE Steel Demand Is About on a Level with Ingot Production (Adjusted). It is believed that demand will show a moderate decline, but still remain good



BUILDING Contracts Have Continued Their Downward Movement. Structural steel bookings were lower in April than in March, contrary to the usual course

STEEL Production in May Was 36 Per Cent above Normal Requirements Prices may have reached a peak. Unfilled orders decreased by less than a seasonal amount





Commodity Prices, Which Have Been About on a Level with Finished Steel for Some Time, Have Latterly Had a Sustained Decline. Pig iron prices are still below a normal relationship with scrap

crease occurs amounting to 2½ per cent. Therefore, we may say that there was a net upward trend of about 5 per cent. Our adjusted index is 136 per cent of normal, against 130 in April and 110 a year ago.

(2) The unfilled orders of the Steel Corporation decreased less than usual in May, the adjusted index being 103.3 per cent of the average for the years 1923-1927, which compares with 101.3 in the preceding month and 82 at the end of May, 1928.

(3) THE IRON AGE index gives an average price of finished steel in May of 2.412c., which is unchanged from April and is 95.6 per cent of the average for the years 1923-1927.

Considering the season, pig iron production also increased sharply in May, reaching a point that is the furthest above normal that has been attained since 1923. It has been exceeded in recent years only in June, July and August, 1923. This makes our adjusted index of the average daily pig iron production 126 per cent of normal. It was 120 in April and 107 a year ago.

Nevertheless, the price of pig iron in May averaged only $18.70, and that is only 87.4 per cent of the average in recent years. It is interesting to remember that in May, 1923, the price index was 139. In 1923, pig iron was dear, while now it is cheap. At that time, production was high, both absolutely and in comparison with steel production. Now it is relatively low, our adjusted index being 10 points below the ingot index. It would seem reasonable to expect that, so long as steel production keeps up to recent levels, there will be a further increase in the pig iron output. At least, it would seem that any decline therein during the next month or two will be small.

Moderate Price Declines May Be Expected

A GENERAL impression that one gets of the iron and steel price situation is that, production being so high and at least a moderate recession in demand being probable, no general advances are to be expected. Rather, declines are probable between now and fall.

This general impression is confirmed by the sustained decline in the level of commodity prices, the Bradstreet index falling again in May to the lowest point since early 1927. It is true that finished steel prices have been sustained at the highest level of the year and pig iron averaged a little higher in May than in April. Finished steel is the highest in comparison with the Bradstreet index that it has been since 1926.

But this condition is quite the usual thing as we approach a turning point. At the peak of a business cycle, it is common for the Bradstreet index to decline while finished steel prices remain stable and pig iron prices rally. This was true in 1920, 1923 and 1926, and the dates are significant. Usually, near their peak—and after a decline in the general price level—finished steel prices hold steady for a period, and this precedent would now suggest steadiness to about August.

Pig iron prices usually decline sooner, and THE IRON AGE index last week showed a sag which possibly may be the beginning of a downward trend. The fact that heavy melting steel scrap at Pittsburgh in May averaged the lowest since last November may be significant.

However, it remains true that pig iron prices are relatively cheap and that the production of pig iron is not unduly large in comparison with the ingot output. It thus seems not improbable that the pig iron market may be maintained for a few weeks before the more sustained decline which is to be anticipated.

Look for Summer Shipments Higher Than Last Year's

Manufacturers of iron and steel products in western Pennsylvania, eastern Ohio, northern West Virginia and western Maryland expect their shipments during the third quarter to exceed by 5.4 per cent actual shipments during the corresponding period last year, according to forecasts of the Allegheny Regional Advisory Board, which held its tenth regular meeting at New Castle, Pa., on June 13.

The forecasts indicated that approximately 155,000 more cars will be required for transportation of all products originating in the territory in the coming quarter than were used in the summer months last year, representing a net increase of 13.8 per cent.

Coke and coal producers are most optimistic, anticipating an increase of 21 per cent in car needs. Tin plate makers are somewhat more sanguine than other iron and steel producers, predicting a 5.7 per cent increase in car requirements. Manufacturers of machinery and boilers forecast an improvement of 8.6 per cent.

American Refractories Institute will meet in Cleveland on June 25 instead of in Pittsburgh. The Hotel Cleveland will be the meeting place.

Further Drop in Wholesale Prices in May

Commodity prices in May are reported at 95.8 (basis 100 in 1926) by the United States Bureau of Labor Statistics. This shows a drop of one point from the April prices and compares with 98.6 in May, 1928. Of the principal groups composing the price average, almost all participated in the drop. Fuels showed the only substantial increase.

Metals and metal products declined from 106.4 to 105.2, owing almost wholly to a drop in non-ferrous metals. Iron and steel showed a fractional rise to 98.4 from 98.2 in April. The item of structural steel, however, appearing under building materials, showed a rise from 97 to 99.6, but this was more than offset by other building items, resulting in a decline of more than one point in the group.

May British Iron and Steel Output Large

LONDON, ENGLAND, June 13 (*By Cable*).—May pig iron output was 654,800 gross tons and that of steel ingots and castings was 840,400 tons. May pig iron production was the largest this year and that in steel was the second largest, exceeded by March at 859,900 tons.

Comparisons of present output with other years is as follows in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Av. monthly..	855,000	638,600
1920—Av. monthly..	669,500	755,600
1922—Av. monthly..	408,500	490,100
1923—Av. monthly..	620,000	706,800
1924—Av. monthly..	609,900	685,100
1925—Av. monthly..	519,700	616,400
1926—Av. monthly..	203,500	296,700
1927—Av. monthly..	607,800	758,200
1928—Av. monthly..	550,900	710,400
1929—Av. first quar..	558,000	801,400
1929—April	611,300	808,600
1929—May	654,800	840,400

The monthly average output of pig iron for the first five months of this year is 588,000 tons, exceeding the monthly average of 1928 of 550,900 tons. Steel output for the first five months of this year has averaged 810,700 tons each month, compared with 710,400 tons monthly last year. This is the highest monthly rate since the war.

Sale of 23 laid-up vessels to the Union Shipbuilding Co., Baltimore, with the understanding that the ships be completely dismantled and scrapped, was authorized by the Shipping Board recently. The ships, sold for $385,000, represent about 200,000 deadweight tons.

Schedule of the next instalments of the ***Business Analysis and Forecast****, by Dr. Lewis H. Haney, Director, New York University Bureau of Business Research, follows:* ***July 4****—Activity in Steel Consuming Industries;* ***July 18****—Position of Iron and Steel Producers.*

High-Speed Becker-Type Router and Vertical Miller

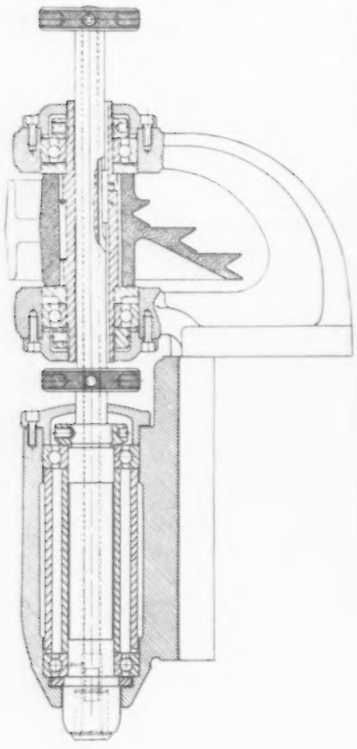
A ROUTER and vertical miller of the Becker type, No. 2, with spindle speeds up to 6000 r.p.m., has been put out by Reed-Prentice Corporation, Worcester, Mass. Either constant-speed or adjustable-speed motor may be used, the former in association with three-stepped cone drive. Belts are used between motor and spindle. The motor rating recommended is 1 hp., in either case, with motor speed 1700 to 1800 r.p.m., constant speed, and range from 500 to 1500 r.p.m., adjustable speed. Spindle speeds from these motor speeds range from 1200 to 6000 r.p.m., approximately.

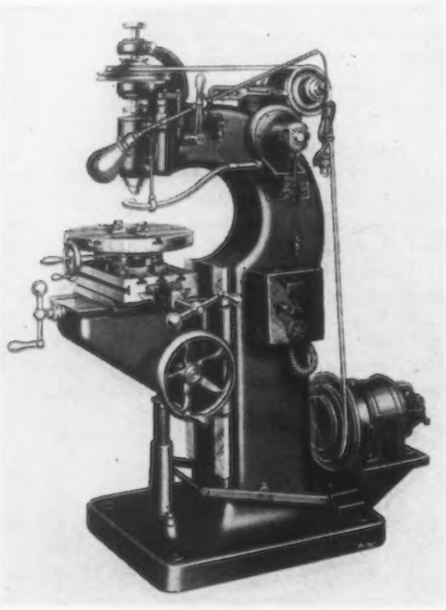
Ball bearings are fitted throughout—four in the spindle mounting, two for the idler pulleys, one for the lower cone pulley. The double auxiliary support for the spindle eliminates belt pull at that point.

Spindle is of high-carbon steel, ground all over. Spanner wrench holes are provided in knurled collar for holding spindle while adjusting collets. All rotating parts—spindle, washers and pulleys—are balanced, eliminating vibration in operation. Grease cups at each bearing furnish lubrication.

While the entire machine is ruggedly built, this is especially true of the column and knee, where the rigid full-box form design avoids vibration troubles. A high percentage of steel is used in the (gray iron) castings. The saddle, extending full length of the table, provides a rigid support. It is scraped and gibbed to the knee and the table is scraped and gibbed to the saddle.

Cross, vertical and longitudinal feed screws are provided with micrometer collars for accurate control and all screws are supplied with ball thrust bearings. Precise control to cutter is arranged through sliding head, operated by either foot treadle or clutch-type handle at right side of column. Micrometer stop is furnished for feeding the head accurately to depth. A steep chip guard in top of knee protects the cross feed from chips.





EXTENSIVE Use of Ball Bearings Features This Machine. Drawing indicates the rigid support which the spindle has, permitting high speeds

Working surface on the machine table is 8⅞ x 18 in. Ranges of feeds are 14 in. longitudinal, 11 in. cross and 15 in. vertical for knee, with head travel of 2 in. The machine occupies a floor space of 54 x 57 in. and stands 63 in. high.

Metal Lath with Rigid Rib for Stiffness

A NEW flat-rib metal lath is being manufactured by Truscon Steel Co., Youngstown, Ohio, for use in all types of construction as a base for interior plastering. Known as Diamond "A" lath, this material is unusually rigid, the uniformly deep ribs providing additional structural reinforcement.

It consists of ribs ⅛ in. deep, separated by less than an inch of mesh in the form of small diamond-shaped openings. The narrow steel strands forming the diamonds are flattened, to give proper resistance to the penetration of excess plaster. The design of the mesh is such that its flatness is utilized to provide greater lateral rigidity. The saving in plaster is said to be as much as 20 per cent.

The new lath is uniformly smooth and easy to handle in erection, the ribs making the sheets rigid, facilitating placing on the studs. It is made weighing 2.75 lb., 3 lb. and 3.4 lb. per square yard, in sheets 24 in. wide by 96 in. long.

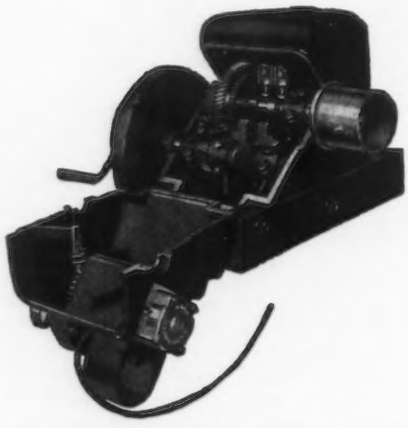
Portable Gasoline-Kerosene Engines

ALL-INCLOSED design and a self-oiling feature are incorporated in a new line of gasoline-kerosene engines announced by Fairbanks, Morse & Co., Chicago. The engines are portable and are made in ratings of 1½ hp. to 7½ hp. The 1½-hp. engine is 16 in. high, 22 in. long and 19 in. wide and weighs 150 lb.

Two pulleys are provided, one of which operates at the engine speed of 1500 r.p.m. and the other at 750 r.p.m. Unit construction throughout makes the cylinder, water hopper, crankcase and bearing supports for both crankcase and camshaft integral parts of the cylinder and base casting. The engine, with the exception of the magneto, can be entirely assembled on this casting.

Protection from dirt, dust, rain and snow is afforded through the fully inclosed feature. By the removal of two bolts all working parts, such as the crankshaft, camshaft, bearing, etc., are open to view and inspection. Removal of 18 bolts completely dismantles the engine.

Self-oiling is accomplished through a special lubricating system which drenches all working parts in oil. The base casting serves as an oil reservoir. The bearing caps have caps to collect the oil, which drips from special baffles directly above on the crankcase cover.

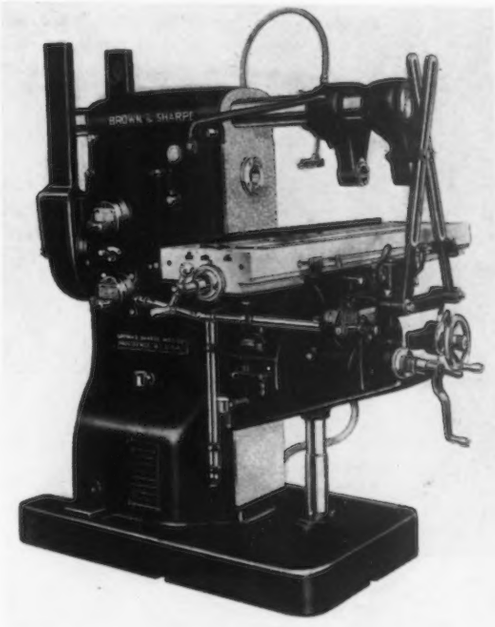


Removal of Two Bolts Permits Opening Inclosure and Exposes All Working Parts

Felt retainers are mounted on the crankshaft and camshaft and return oil grooves are cut in these shafts. A special crankcase breather eliminates all possibility of leaking oil. The crankcase breather, further, does away with compression in the crankcase. Instead of forcing the oil out at the gaskets, the special breather sucks in all oil collected at the gaskets, by maintaining a vacuum within the crankcase.

Increased Size Standard Milling Machine

AN addition to its line of standard milling machines has been made by the Brown & Sharpe Mfg. Co., Providence, R. I. They are milling machines of the No. 4A standard universal and No. 4B standard plain milling machine. They are the largest of the standard line.



New Large Size Standard Universal Milling Machine of Brown & Sharpe Mfg. Co. A large size plain milling machine has been announced, also

The machines are all gear driven with anti-friction bearings from driving pulley to spindle and in the feed and power fast travel mechanisms. Two operating positions are provided on each machine (one at the front and one at the rear of the table), with all levers controlling the operation of the machine readily available from either position. Dual control for feed changes (a lever at the front of the table and one at the rear) facilitates feed changes being conveniently accomplished.

Speed changes in two series are made by a single lever at the side of the machine. The rates of feed and speed for which the machine is set are indicated by direct reading dials located above the control levers. The machines are equipped with power fast travel for longitudinal, transverse and vertical movements, operated by handy levers.

One of the important features of the No. 4B standard plain milling machine is the automatic disengagement of the power fast travel with simultaneous engagement of the cutting feed without attention on the part of the operator. This feature makes possible a considerable saving in operator's time, as the work can be run up to a point close to the cutters before the cutting feed is engaged. It also prevents injury to the work and cutters through accidentally jamming the work into the cutters. The operator is free, after the fast travel is engaged, until the cut is completed, during which time he may be engaged in operating another machine, thus decreasing the man-hour cost of one machine.

Electric Ladle-Carrying Tructor

HANDLING molten metal from a central cupola to distant bays requires both capacity and speed. This is provided in a new combination of a ¾-ton skid ladle and electric lift tructor, put out by the Elwell-Parker Electric Co., Cleveland. The tructor is built with dust-proof bearings, wide rubber tires and good clearances.

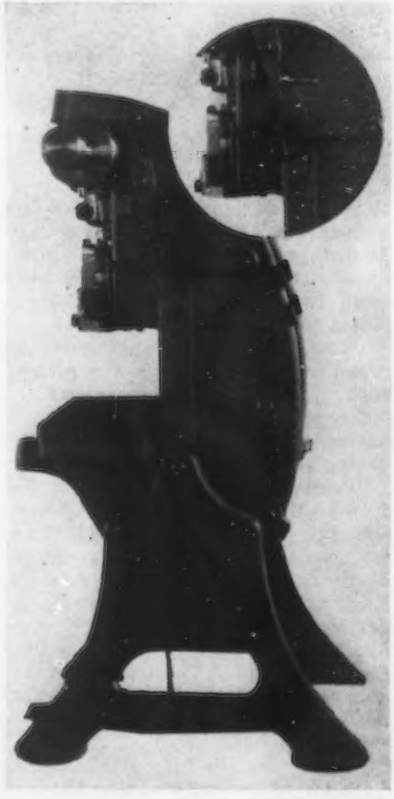
This combination will transport molten metal to points not usually within pouring distance of the cupola. It will pick up the ladle at cupola and transport the load 500 ft. in 3 min., along a congested floor, without spilling or interfering with workmen in other pursuits.

Special care has been taken in the design to safeguard operator, load and workmen along its path. Built of heavy steel plate and channels, hot riveted, and with alloy steel drop forged drive parts, knuckles and steering levers and fuseless inclosed motors, it is a machine which has use in the core room, grinding room or yard. The load capacity is 6000 lb.

Non-Repeat Device for Power Presses

POWER presses made by the Federal Press Co., Elkhart, Ind., may now be furnished with a non-repeating clutch control mechanism. The company has been granted a patent covering the application of this type of control to power presses and similar equipment.

Operation of this new feature is simple but positive, and equipping presses with this new non-repeat clutch control mechanism eliminates possibility of the press repeating. This equipment will function and stop the ram action after one stroke, even if the trip pedal is intentionally or unintentionally held down, and it requires the full release of the trip pedal before the ram will function again.

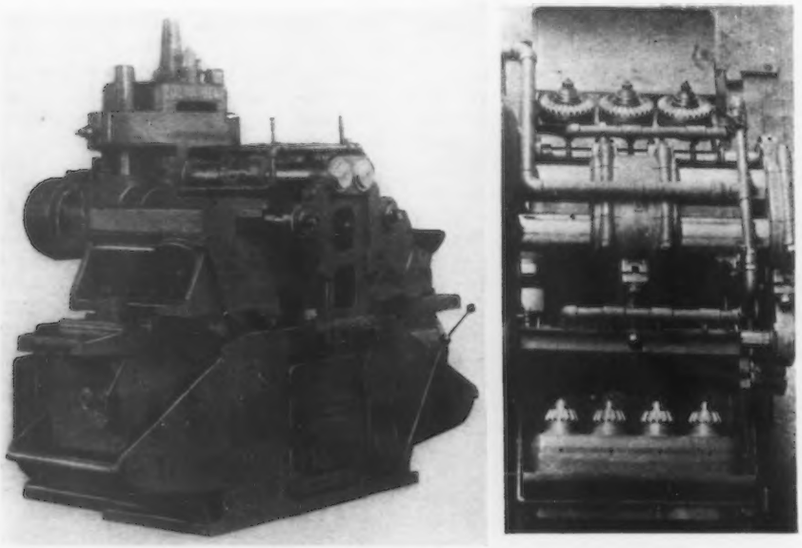


Non-Repeat Mechanism with Slide Joint Set Ahead of Floating Pin in Trip Bar (Main View) Allows Continuous Operation. Inset shows setting for non-repeat operation

Where a continuous operating press is required, the non-repeat mechanism is easily disengaged by the slipping forward of a sliding joint. There are no screws or bolts to remove and no adjustments necessary, making the equipment fool-proof.

Mills Three Gears and Four Pinions at Once

A SPECIAL type of milling machine which has several unusual features of design and construction has been built by the Kearney & Trecker Corporation, Milwaukee. It was developed for rough milling the teeth in differential gears and pinions for farm tractors on a quantity production basis, having a capacity of 18 gears and 40 pinions an hour. Three 4 to 5 DP, high-carbon, 28-tooth gears, and four 14-tooth pinions are milled simultaneously, the cutting time for a gear tooth being 17 sec., and that for a pinion tooth 16 sec.



Automatic Action Is Complete, Except for Loading the Indexing Spindles. At right is shown the arrangement of the work

While the machine is not universal, it can be adapted for gears or pinions with a different number of teeth, or different pitch diameter. The entire operation, except for loading the indexing spindles, is automatic.

Primarily the machine is a No. 1404 Mil-waukee-mill simplex, equipped with a two-spindle horizontal head, and two opposed, independently controlled cam-operated tables. Each table carries an automatic indexing fixture, one having three spindles for the gears, and the other four for the pinions. The two cutter arbors carry respectively three and four high-speed steel bevel gear roughing cutters.

The tables are independently controlled by drum cams, so that one side may be stopped at the out stroke for changing work of cutters without stopping the other. The cams, rollers and levers of the indexing mechanism on the tables are of hardened steel, and the work spindles are mounted in Timken bearings. Each work spindle is automatically locked in the index while in the cut. The whole—arbors, work tables and indexing mechanism—is driven by a single motor through a series of horizontal and vertical gear-reduction units.

After loading the spindles, the operator starts the table movement. The work is carried rapidly to the cutters, and slowly through the cut, when the table reverses and returns quickly to the starting point. During the reverse travel the work is indexed, ready for the next cut. The cycle is completely automatic, and is continued until the blank has been indexed and cut around its entire circumference. The operator can unload one fixture while the other is operating. Thus about 90 per cent of the maximum cutting time of the machine is utilized.

Automatic Lathe for Light Production Work

AN automatic lathe recently developed by Seneca Falls Machine Co., Seneca Falls, N. Y., is known as the "Lo-Swing Model U Automatic." It has been developed as a companion machine to the large Lo-Swing Model R Automatic. The Model U is designed to machine the lighter types of steering knuckles, stem pinions, side gears, pistons, both aluminum and cast iron; also to do second operation work on some larger parts.

When the machine is started, it makes a complete cycle and stops with carriage slides returned to the starting position. A single lever brings the tail-stock center into position and starts the machine in operation. It is necessary, however, to give this lever a distinct and separate movement to start the machine. This is done to avoid accidental starting.

When the machine is equipped for individual motor drive, the motor is mounted in the base. Drive through belt or silent chain is entirely inclosed. Pick-off gears are provided for changing both speeds and feeds.

Ball and roller bearings are provided for all shafts, including the main spindle, so that, if desired, the high speeds required by the latest developments in cutting tool materials may be obtained. All cams, gears and other mechanisms in the head-end are automatically lubricated by means of a force feed pump.

Longitudinal and cross-feed movements of the front carriage slide, as well as the cross-feed movements of the rear forming and squaring slide, are obtained by cams which are hardened and ground. The ways on which the carriage travels on the bed are equipped with a hardened and ground steel plate.

The machine will take work 5 in. in diameter and 12 in. long. It weighs approximately 5000 lb., and is so arranged that the new automatic loading devices being developed by the company may be applied.

Made to Machine Light Pieces on a Production Basis, This Lathe Permits Speeds in Keeping with the Latest Cutting Tool Developments

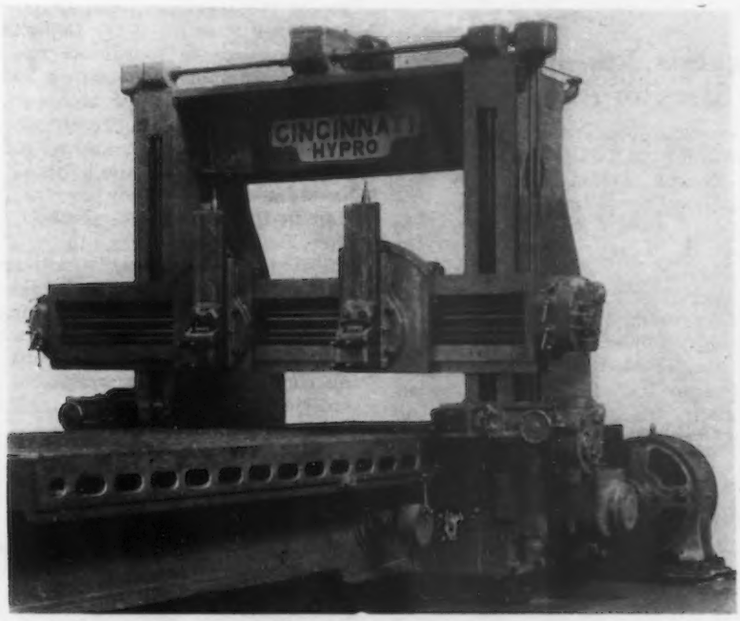
Becker Ovens to Be Built at South Chicago

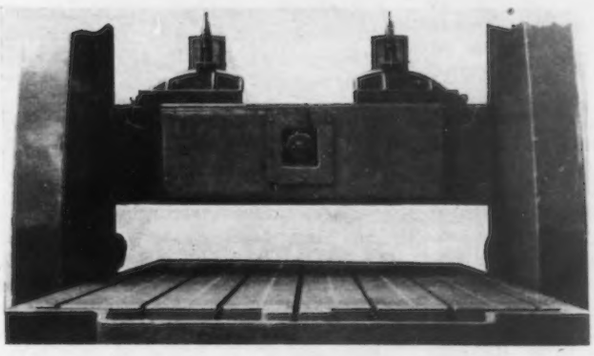
THE Wisconsin Steel Co. has contracted with the Koppers Construction Co., Pittsburgh, for the design and construction of an addition to its by-product coke plant at South Chicago, Ill.

Included will be 45 Becker-type ovens suitable for underfiring with blast furnace gas. The ovens will have a carbonizing capacity of over 180,000 tons of coal a year. The contract also calls for the altering and enlarging of the benzol and by-product plants.

New 96 x 96-In. Hypro Cincinnati Planer

CARRYING the standard features which have been embodied on the Hypro planer in the past, a harp clamp has been added to the saddles by the Cincinnati Planer Co. to eliminate any possible chance of the harp pulling away from the saddle when the slide and tools are extended below the bottom of the rail. A narrow guide has been added to the saddles on this size machine to prevent springing.





The New Cincinnati Planer Has Electric Rail Clamp, Harp Clamp for Saddles, and Drive Box on Housing

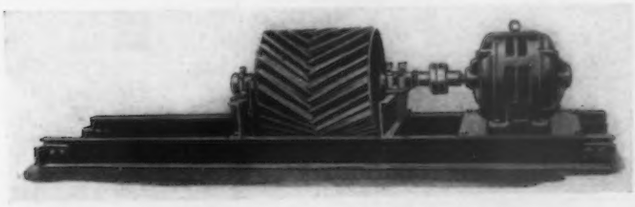
Electric rail clamps have been added, which are shown in the close-up view. A small torque motor is placed inside of the rail and a self-contained unit operates the two clamps on the inside. A push button automatically disengages or engages the power clutch and then releases the clamps. With this interlock it is impossible to raise and lower the rail while it is clamped.

A parallel drive box has been placed on the right hand side of the housing. This box contains two hardened chrome-nickel spiral bevel gears, with the shafts mounted on ball bearings. Floor space that is usually taken up by the motor has been saved. This particular addition can be had on all Cincinnati planers.

Device for Aerating Sand and Breaking Up Lumps

CONSISTING of a motor-driven drum, on the face of which are staggered blades running from the outer edge to the center and taking a form similar to that of a herringbone gear, a new product, known as the Sandarator, has been brought out by the Beardsley & Piper Co., Chicago.

This unit is made for mounting under the discharge belt into the storage tank or hopper. When in operation it whirls the incoming sand into all parts of the tank, imparting a thorough aerating and cooling action, and breaking up lumps that have gathered on the conveyor. The Sandarator is made in sizes to suit conditions, and may be applied with equal facility to new or existing sand storage tanks or hoppers.

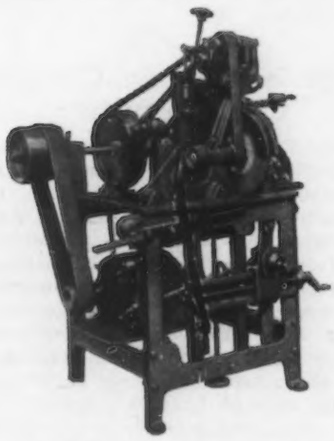


Lump Breaker Which Aerates Through Whirling Incoming Sand to All Parts of the Hopper

Automatic Circular Saw Grinder

GRINDING by hand cannot give the accurate, even saw teeth which are secured by automatic grinding, when the spacing of the teeth is done mechanically. The Foley Saw Tool Co., Minneapolis, has placed on the market an automatic saw grinder, which grinds (and rejoints in the same operation) metal-cutting circular saws from 6 to 30 in. in diameter, having either straight or Cochran & Bly teeth. Teeth from four to the inch up to 2-in. spacing can be ground.

This grinder, which is known as the Model G-111, automatically brings high and low teeth to an even size and height as it grinds them to a cutting edge. When the saw is thus properly jointed and brought to a perfect circle, every tooth cuts and the saw not only runs smoother and cuts faster and truer, but it also stays sharp longer.



Saw-Tooth Grinder with Speed Up to 70 Teeth a Minute, Taking Saws Up to ⅛-in Tooth Spacing

Constructed for long wear, the machine is inclosed so that filings, dust and bits of emery, etc., cannot work into moving parts. Either belt drive or individual motor can be used. Grinding wheels of different shapes, sizes and hardness are available for grinding all types of saws and are easily interchangeable.

Hilb & Bauer, Cincinnati, old materials dealers, have moved their offices in the Traction Building to larger quarters in rooms 502-505 of the same building.

Suspend Part of Proposed Southern Pig Iron Rates

WASHINGTON, June 18.—The Interstate Commerce Commission last Wednesday suspended from June 13 to Jan. 13 tariff schedules filed by railroads reducing rates on pig iron from Southern blast furnaces to St. Louis and intermediate destinations in Indiana, Illinois and Iowa. Illustrative of the schedules was the proposal to reduce the present rate of $4.42 per gross ton on pig iron from Birmingham to St. Louis to $3.69.

The commission permitted other tariff schedules, reducing pig iron rates from Southern producing points to Gulf and south Atlantic ports, to go into effect on June 13. The only protests against the latter reductions came from the Mobile, Ala., Chamber of Commerce and the Alabama State Docks Commission, and they were withdrawn when at a conference in Washington the railroads agreed to a rate of $2.25 in place of the rate of $2.45 originally proposed, the result being that they did not narrow the spread in rates between Mobile and other ports.

The suspended tariffs will come up for hearing on July 12 at the Sherman Hotel, Chicago, before Examiner Crowley.

Donner Steel Co. Changes Capital Structure

The Donner Steel Co., Buffalo, has called its outstanding 8 per cent cumulative prior preference stock for redemption on June 29, 1929, at $109 a share. An issue of $6 convertible preferred stock has been authorized, together with sufficient common stock to make provision for conversion. This new $6 convertible preferred stock has been offered in exchange for the outstanding 8 per cent stock at the rate of 1.1 shares for one, or one share and $10 cash, at the stockholder's option, prior to the redemption date.

July 1 the company will have $6,313,000 bonds outstanding; 30,000 authorized shares of $6 convertible preferred stock and 570,000 authorized shares of no par value common stock.

Suggests Research to Find Uses for Alloy Scrap

The establishment of a research bureau for the purpose of studying and finding markets for alloy steel scrap was recommended to the Institute of Scrap Iron and Steel by Walter S. Doxsey, editor of the *Daily Metal Trade*, at a dinner meeting of the Cleveland chapter of the institute Wednesday, June 12. The increasing importance of alloys in steel has created a problem for the scrap iron industry to solve in cooperation with the consumers of scrap, it was said.

Radiator and Boiler Makers Organize

The Institute of Boiler and Radiator Manufacturers has been formed by manufacturers of low-pressure boilers and radiators. The institute will cooperate with the Federal Trade Commission in carrying out the rules adopted at a recent trade practice conference.

H. T. Boynton, of the Richardson & Boynton Co., is chairman; Grant Price, National Radiator Corporation, vice-chairman; F. W. Herendeen, Geneva, N. Y., secretary-treasurer. Executive committee members are: M. J. Beirn, American Radiator Co.; E. E. McNair, United States Radiator Corporation; M. D. Rose, Pierce, Butler & Pierce Mfg. Corporation; A. H. Schroth, Richmond Radiator Co., and Grant Price, National Radiator Corporation.

Slag Association Takes Up Simplification Program

The National Slag Association, at its twelfth annual meeting, held at its headquarters, Leader Building, Cleveland, June 6 and 7, decided to accept the services of the Division of Simplified Practice of the Department of Commerce to coordinate the size requirements of the existing specifications of the various technical organizations which at present show a wide variation in their limits. A comprehensive survey of the industry will be started immediately as the first step in the work of simplification of sizes.

The association shortly will begin a 10-year test program in the laboratory of the Bessemer Limestone & Cement Co. along lines of work which is an extension of investigations being conducted by a committee of the American Society for Testing Materials.

H. R. Colwell, of the Division of Simplified Practice, Department of Commerce, and F. H. Jackson, senior engineer of tests, U. S. Bureau of Public Roads, were guests of the association at the meeting. At a meeting of the directors the old officers were reelected. They are: C. L. McKenzie, Duquesne Slag Products Co., Pittsburgh, president; C. E. Ireland, Birmingham Slag Co., Birmingham, vice-president, and H. J. Love, Cleveland, secretary-treasurer.

Iron and Steel Institute's Next Meeting

The autumn meeting of the Iron and Steel Institute will be held at Newcastle-upon-Tyne, Sept. 10 to 13. An arrangements committee has been formed with E. J. George, of the Consett Iron Co., Ltd., as chairman, and T. T. Dixon as secretary. The general meetings will be held in the Festival Hall of the North East Coast Exhibition. Social functions and visits and excursions to the principal works on Tyneside and Teesside, including collieries and coke-oven plants, are being arranged.

Chapter of Scrap Institute Formed at St. Louis

The twelfth chapter of the Institute of Scrap Iron and Steel was formed at a meeting at the Hotel Statler, St. Louis, on June 10. Scrap dealers from Missouri, southern Illinois, Indiana, Iowa, Oklahoma, Tennessee, Texas and Nebraska attended. Twenty-six members were enrolled. B. P. Williams, Hickman, Williams & Co., St. Louis, was elected president; William Rosenthal, Hyman-Michaels Co., St. Louis, chairman of executive committee; Jack R. Forcheimer, St. Louis; Louis Galamba, Sonken-Galamba Corporation, Kansas City, Mo., and S. O. Singer, Singer Iron & Steel Co., Houston, Tex., vice-presidents; Fred S. Fuld, Elson-Fuld Co., St. Louis, secretary-treasurer.

German foreign trade in iron and steel for March and April, 1929

(In metric tons, according to Department of Commerce)

	Exports		Imports	
	March	April	March	April
Pig iron and ferroalloys	27,090	35,904	12,393	12,729
Ingots, blooms, and billets	24,715	68,157	9,167	7,653
Iron and steel bars, rods, angles	59,399	139,447	39,704	49,956
Structural	3,540	8,093	121	313
Hoops and bands	10,804	19,689	7,332	6,492
Plates and sheets	32,472	58,985	6,107	5,011
Galvanized sheets	1,837	2,318	220	499
Tin plate	1,696	4,542	1,899	1,857
Cast iron pipe	2,822	11,120	2,784	5,962
Wrought iron pipe	30,260	42,636	1,676	2,615
Pipe fittings	3,736	4,587	90	77
Rails	16,716	44,268	9,138	12,068
Railroad material, other than rails	5,613	10,715	854	808
Plain wire	36,455	65,262	9,699	8,122
Barbed wire	5,554	7,058	447	369
Wire rope	1,301	1,629	44	90
Wire cloth	2,047	2,684	4	4
Other wire manufactures	681	905	67	69
Nails, tacks, rivets and washers	8,871	11,171	202	159
Castings and forgings	15,562	21,569	2,690	2,625
Other iron and steel manufactures	3,350	4,680	907	1,152
Total	294,521	565,419*	105,545	118,630

*Former peak, 433,707 tons, in August, 1928.

American Tin Trade Association Meets

First Gathering of Buyers and Sellers—Steel Corporation's Buying Policy—Tin Research Advocated

AN informal dinner was held by the American Tin Trade Association, Wednesday evening, June 12, at the Planters Restaurant, New York, and was attended by about 100 members of the trade, including the representatives of many of the large consumers throughout the country, with an especially good representation of the tin plate industry.

C. S. Trench, president, said that the dinner represented the first general gathering of buyers and sellers of tin that has ever been held in this country, and that it was the hope of the present officials of the association that it becomes an annual event. In fact, it is the carrying out of one of the purposes for which the association was formed, namely, to foster a frank and friendly intercourse among its members. Mr. Trench said in part:

> The American Tin Trade Association has now been in existence about six months but, except for the circulation of its contracts, there have been few visible signs that one of the oldest trades had formed an organization of its own.
>
> Owing to the antics of the tin market, your committee felt it would be a tiresome repetition to ask a conjurer to perform before you this evening, but it is my privilege to be able to introduce a fortune-teller, if our honored guest, A. B. Parsons, Minerals Research Corporation, will pardon this characterization of his abilities and performances. About a year ago when the majority of the trade were thinking of tin values in the 50's and 60's, Mr. Parsons furnished a striking summary and forecast under the caption "Is 45-Cent Tin Likely?" The market has since furnished the answer.

Mr. Parsons, in summing up the situation, said he had reached four conclusions:

> Left to its own devices and viewed from the standpoint of statistics, the outlook for the tin market during the remainder of 1929 is for little advance in prices and a probable decline.
>
> If the London "group" continues to take metal out of the market, it may be possible to keep the statistical position from further deterioration, but the effect on sentiment of the knowledge that this is being done will tend to offset the advantage gained.
>
> The formation of an effective association of producers, if accomplished, should "stabilize the industry"—a euphonious phrase which may be translated as "advance the price."
>
> The prevailing unfavorable market doubtless has had, and will have, the effect of dampening enthusiasm for the installation of new dredges and other equipment, so that with a steady increase in consumption, the outlook for the future—say, two or three years hence—is good.

A Plea for Research

J. W. Furness, chief of the minerals division, Department of Commerce, made a plea for research on pig tin. He called attention to the fact that there has never been any effort made to increase the use of tin as has been done in other metals, mentioning in particular nickel as an example. He pointed out that after the war the consumption of nickel dropped 40 per cent, but as a result of scientific research and efforts to extend the use of nickel, there has been a phenomenal increase in the consumption during the past year.

Steel Corporation Buys in Primary Markets

John Hughes of the United States Steel Corporation, the largest consumer of tin in the world, said that the Steel Corporation always bought tin for future delivery in the primary markets, and although this policy, on account of the decline in tin, showed them a high cost on supplies being received at present, still he stated that it was the only safe policy that his company could pursue. He called attention to the dangers of consumers not making provision for their future requirements and said that the hand-to-mouth policy is more or less dangerous to any consumer using substantial tonnages.

He took occasion to pay a tribute to the importers, dealers and brokers who are engaged in supplying tin to the consumers and said they were worthy of the support of the trade generally. He said the Steel Corporation is in favor of broad markets and free competition and that he welcomed the formation of the American Tin Trade Association, not only for its value as a factor for sure and fair practices in the trade but also for making frank and friendly intercourse possible among all interests connected with this important and essential metal.

Why Tin Smelting in America Failed

W. F. Kemble, of the Patino Mines & Enterprises, said the reason for the failure to continue tin smelting in America was in part due to the lack of a tariff to overcome the higher wages here as compared with England, and also to the failure of the American trade to buy the output of the American smelter as quickly and in proportion with what was turned out at the time. He gave some interesting facts regarding tin mining in Bolivia and especially as regards the Patino interests, who produce nearly one-half the Bolivian output. He stated that their activities are confined to producing the concentrates, and their policy is to sell these as quickly as produced to the smelters in England and on the Continent, at current market quotations.

The evening closed with the showing of moving pictures of tin mining in Bolivia by the courtesy of the Patino Mines & Enterprises.

National Metals Congress Prepares September Program

A National Metals Congress, to a considerable extent an outgrowth of the conventions and expositions held by the American Society for Steel Treating, will be held in Cleveland, Sept. 9 to 13. It opens simultaneously with the eleventh annual convention and exposition of the A. S. T. M. Coincidental will be the national fall meeting with sessions of the following societies: American Welding Society, Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers, Iron and Steel Division of the American Society of Mechanical Engineers and Iron and Steel Division of the American Institute of Mining and Metallurgical Engineers.

In addition to the metals congress there will be assembled in Cleveland's public auditorium the eleventh annual metal exposition for the display of modern types of machinery and equipment used by metal-working concerns of the country. Facilities will permit one of the greatest metal expositions that has yet been arranged. Some 200 exhibitors have subscribed for display space. Details of the programs are being worked out.

All of the five national societies holding simultaneous conventions during that week have practically completed the selection of papers for the event but the arrangement of them is to be given final consideration at a meeting to be held at Atlantic City on Thursday, June 27, where endeavor will be made so to arrange the presentation of papers as to avoid conflict of interests.

Fabricated Structural Steel

Awards of 45,000 Tons Place Week Among Best of Year—New Business Smallest of Year

AWARDS of about 45,000 tons of structural steel placed the week among the good tonnage weeks of the year. Among the larger contracts closed were 6850 tons for a bridge at Pittsburgh, 2750 tons for ore unloaders at Toledo, Ohio, 5000 tons for a power station at Michigan City, Ind., and 4700 tons for an office building in Newark, N. J. The total of new projects was the smallest of the year, with only 8200 tons reported. The only sizable new projects are 2000 tons for an office building in New York and 2000 tons for an office building at the State Capitol, Harrisburg, Pa. Awards follow:

SPRINGFIELD, MASS., 450 tons, hangar, to unnamed fabricator.

WALPOLE, MASS., 120 tons, manufacturing plant, to New England Structural Co.

LEICESTER JUNCTION, VT., 230 tons, Rutland Railroad bridge over Otter Creek, to Phoenix Bridge Co.

NEW HAVEN, CONN., 800 tons, City Hall, to American Bridge Co.

NEW YORK, 150 tons, New York Central Railroad office building, Morris Avenue, Bronx, to McClintic-Marshall Co.

NEW YORK, 300 tons, apartment building, 146 West Twenty-fourth Street, to Dreier Iron Works.

STATE OF NEW YORK, 150 tons, highway bridges, to American Bridge Co.

NEWARK, N. J., 4700 tons, Lefcourt-Plaza building, to Hay Foundry & Iron Works.

BALTIMORE, 2000 tons, factory building for Procter & Gamble Co., to American Bridge Co.

CHESAPEAKE & OHIO RAILROAD, 150 tons, bridges, to unnamed fabricator.

MEMPHIS, TENN., 1600 tons, Murray Body Corporation plant, to Virginia Bridge & Iron Co.

ATLANTA, GA., 245 tons, Candler office building, to Virginia Bridge & Iron Co.

BATON ROUGE, LA., 100 tons, highway bridge, to Virginia Bridge & Iron Co.

YOUNGSTOWN, 2500 tons, pipe mill for Republic Iron & Steel Co., to McClintic-Marshall Co.

PITTSBURGH, 1600 tons, 10 steel barges for Rodgers Sand Co., six to American Bridge Co. and four to Jones & Laughlin Steel Corporation.

PITTSBURGH, 4000 tons, Allegheny General Hospital, to Jones & Laughlin Steel Corporation.

PITTSBURGH, 325 tons, Junior beams, St. Frances Hospital, to Jones & Laughlin Steel Corporation.

SWISSVALE, PA., 135 tons, Junior beams, Dickson School, to Jones & Laughlin Steel Corporation.

BELLE, W. VA., 100 tons, extension to power station for Du Pont Engineering Co., to Virginia Bridge & Iron Works.

SUNBURY, PA., 325 tons, Sunbury Industrial Building, to Shippers' Car Line.

PITTSBURGH, 6850 tons, Pittsburgh & West Virginia Railroad bridge over Monongahela River, to American Bridge Co.

TORONTO, ONT., 100 tons, Junior beams, Grant Central Market, to Jones & Laughlin Steel Corporation through Dominion Bridge Co.

DETROIT, 150 tons, theater, to R. C. Mahon Co.

DETROIT, 260 tons, factory for Ternstedt Mfg. Co., to McClintic-Marshall Co.

FLINT, MICH., 120 tons, First National Bank building, to Flint Structural Steel Co.

FLINT, 100 tons, Sears, Roebuck & Co., to Flint Structural Steel Co.

FORDSON, MICH., 500 tons, telephone exchange building, to R. C. Mahon Co.

GRAND RAPIDS, MICH., 750 tons, vocational school, to Russell Steel Construction Co.

JACKSON, MICH., 200 tons, theater, to R. C. Mahon Co.

TOLEDO, 2750 tons, ore unloaders for Hocking Valley Railroad, to Wellman-Seaver-Morgan Co.

TOLEDO, 2500 tons, car dumpers for Hocking Valley Railroad, to Industrial Brownhoist Corporation.

CLEVELAND, 150 tons, Shaker Heights power house, to Massillon Bridge & Structural Co.

TOLEDO, OHIO, 700 tons, high school, to Massillon Bridge & Structural Co.

MICHIGAN CITY, IND., 400 tons, factory building, to McClintic-Marshall Co.

MICHIGAN CITY, 5000 tons, power house, to an unnamed bidder.

LOGAN, IOWA, 450 tons, highway bridge, to Pittsburgh-Des Moines Steel Co.

KANSAS CITY, MO., 400 tons, Professional Building, to Kansas City Structural Steel Co.

SAN FRANCISCO, 935 tons, pier shed No. 48, to Pacific Coast Engineering Co.

FULLERTON, CAL., 100 tons, school, to Brombacher Iron Works.

LOS ANGELES, 1300 tons, Southern California Telephone Co. building, to Consolidated Steel Corporation.

SEATTLE, 490 tons plates, penstock for Mount Diablo power project, to unnamed bidder; general contract to Rumsey & Jordan.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

HARTFORD, CONN., 200 tons, sales and service station.

SALEM, MASS., 150 tons, theater.

NEW YORK, 3700 tons, Queensborough bridge roadway, all bids rejected, new opening June 28.

NEW YORK, 2000 tons, Goldman-Sachs building on Pine Street.

BRIDGEPORT, CONN., 500 tons, power station for United Illuminating Co.

HARRISBURG, PA., 2000 tons, State Capitol office building.

BUFFALO, 8000 tons, City Hall, bids in.

DETROIT, 200 tons, store for Paxson & Co.

DETROIT, 250 tons, factory for Array Co.

GRAND HAVEN, MICH., 200 tons, telephone exchange building.

CLEVELAND HEIGHTS, 400 tons, Christian Science Church.

CLEVELAND, 100 tons, Cleveland Institute of Aviation.

CLEVELAND, 100 tons, addition to City Hospital.

SOUTH BEND, IND., tonnage not stated, plant addition for Oliver Farm Equipment Co.

CHICAGO, tonnage not stated, 16-story building at 209 South Wabash Avenue for John R. Thompson Co.

CHICAGO, BURLINGTON & QUINCY RAILROAD, 500 tons, station at Omaha, Neb.

UNION PACIFIC RAILROAD, 1000 tons, building at Omaha.

SEATTLE, 160 tons, City-County Building addition; general contract to Hans Pedersen.

LOS ANGELES, 600 tons, exhibit building, State Fair Grounds, Pomona, Cal.; bids opened.

SACRAMENTO, CAL., 605 tons, crossing at Barstow, Cal.; Sharp & Fellows, Los Angeles, low bidders.

Aluminum Sheets to Be Used for Plant Building

Aluminum sheets will be used to cover a building to be erected by the General Fireproofing Co., Youngstown. The new building, which will provide additional shipping facilities, will cost about $300,000. The sheets will be furnished by the Aluminum Co. of America.

Sheets of aluminum and aluminum alloys have been used for a variety of purposes, but this probably is the first time they have been specified for a building of this type.

Sales of the General Fireproofing Co. for the first five months of this year were 30 per cent larger than those of the same period last year. President George Brainard says that the company has never entered the summer with such a large volume of business on its books.

Fabricated Steel Orders Gained Slightly in May

Orders for fabricated structural steel in May totaled 276,116 net tons, or 90 per cent of the capacity, at 306,620 tons, of the 198 companies reporting to the Department of Commerce.

This was a slight gain over orders of 275,424 tons, or 87 per cent of the capacity, at 315,380 tons, of the 225 companies which reported in April. Computed bookings in May were 346,500 tons, against 334,950 tons, while computed shipments were 311,850 tons, or 81 per cent of capacity, as compared with 304,150 tons, or 79 per cent of capacity.

Computed orders for the first five months of the current year were 1,582,350 tons, or 82 per cent of capacity, against 1,274,350 tons, or 60 per cent of capacity, for the corresponding period of last year.

Unfilled Brass Ingot Orders

CHICAGO, June 12.—On June 1, unfilled orders for brass and bronze ingots and billets on the books of the members of the Non-Ferrous Ingot Metal Institute amounted to a total of 13,339 net tons, according to an announcement of the institute issued today. On May 1, the unfilled orders were 17,215 tons, and on April 1 they were 22,755 tons.

European Steel Markets Stronger

Britain Buying More Continental Semi-Finished—Italian Steel Output Higher—Germany Exports More Farm Tools

(*By Cable*)

LONDON, ENGLAND, June 17.

PIG iron is strong and demand heavy, but sales are curtailed by the shortage of supplies, especially of Cleveland grades. Makers would blow in more furnaces, but for the scarcity of fuel supplies.

Hematite iron sales are increasing with domestic and export demand active as makers are able to offer fairly early delivery.

Steel production is increasing and, on the Northeast coast, shape mills are operating full. Ship plate specifications are coming out more freely, but plate mill capacity is still in excess of demand, and competition for export orders is keen.

British demand for foreign semi-finished and finished material is resuming and some substantial business in plates and shapes has been closed. Continental semi-finished steel cannot compete successfully with the British product in some inland districts.

British exports of pig iron in May were 58,500 tons, of which the United States received 5500 tons. Total iron and steel exports in May were 443,000 tons.

Tin plate business is rather quiet, as consumers are awaiting developments in the tin market. Inquiry is well maintained, however, suggesting that tin plate will be needed soon. Makers are generally well booked. May exports of British tin and terne plates were 57,000 tons, the largest monthly total for five years.

Galvanized sheets are quiet with Calcutta, India, stocks reported at 25,000 tons. British exports to India in May declined about 10,000 tons. Black sheets are quiet.

Following acceptance of the Austin, Friars Trust offer to the United Steel Co.'s and the United Strip & Bar Mills, Ltd., a holding company is to be formed to take over the joint holdings, under the name Steel Industries of Great Britain, Ltd., with capital stock of £11,000,000 ($53,350,000). The new company is expected eventually to include other important iron and steel producers.

Polish Mills Seek Increased Rail Exports

HAMBURG, GERMANY, June 3.—Polish rail mills are engaged in efforts to increase their export business. They are not members of the International Rail Makers' Association and in 1928 exported only 15,000 tons. When the present contracts for rails from the Polish Government have been executed, it is estimated that the mills will still have a large export surplus, and recently two Polish mills have sent representatives to South American countries seeking contracts. Polish mills believe that exports can be increased to 50,000 tons or more annually, but at prices below those fixed by the International Rail Makers' Association for its members.

Franco-Belgian Comptoir Controls Iron Exports

BRUSSELS, BELGIUM, May 30.—The new Comptoir Franco-Belge-Luxemburg des Fontes Phosphoreuses de Moulage, with headquarters here, was organized as a cooperative association. It will conduct all export business of its members in foundry iron of 0.5 per cent or more phosphorus, allocating tonnages on a basis of 21.8 per cent to Luxemburg, 34.2 per cent to France and 44 per cent to Belgium.

Announcement has been made of the merger of the Cartoucherie Belge and the Etablissements Bachmann with the Fabrique d'Armes de Guerre of Herstal.

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at $4.85 per £ as follows:

Durham coke, del'd	£0 18½s.	to	£0 19s.	$4.48	to	$4.60
Bilbao Rubio ore*	1 3			6.18		
Cleveland No. 1 foundry	3 11			17.21		
Cleveland No. 3 foundry	3 12½			17.58		
Cleveland No. 4 foundry	3 7½			16.37		
Cleveland No. 4 forge	3 7			16.25		
Cleveland basic (nom.)	3 7½			16.37		
East Coast mixed	3 13½			17.70		
East Coast hematite	3 14			17.94		
Rails, 60 lb. and up	7 15	to	8 15	37.59	to	42.43
Billets	6 10	to	6 12	31.52	to	32.12
Ferromanganese	13 15			66.69		
Ferromanganese (export)	14 0			67.90		
Sheet and tin plate bars, Welsh	6 12½			32.12		
Tin plate, base box	0 18⅓	to	0 18¾	4.45	to	4.53
Black sheets, Japanese specifications	13 5			64.26		
				C. per Lb.		
Ship plates	7 12½	to	8 2½	1.66	to	1.76
Boiler plates	9 0	to	10 10	1.95	to	2.27
Tees	8 2½	to	8 12½	1.76	to	1.86
Channels	7 7½	to	7 17½	1.60	to	1.71
Beams	7 2½	to	7 12½	1.55	to	1.65
Round bars, ¾ to 3 in.	7 15	to	8 7½	1.67	to	1.81
Steel hoops	9 0	to	10 0	1.95	to	2.16
Black sheets, 24 gage	10 5	to	10 10	2.21	to	2.27
Galv. sheets, 24 gage	13 12½	to	13 15¾	2.94	to	2.98
Cold rolled steel strip, 20 gage (nom.)	12 0			2.64		

*Ex-ship, Tees, nominal.

Continental Prices F.O.B. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3 10s.	to	£3 14½s.	$16.97	to	$18.06
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3 12			17.45		
Billets, Thomas	5 3	to	5 8	24.98	to	26.19
Sheet bars, Thomas	5 8	to	5 8½	26.19	to	26.31
Wire rods Low C., No. 5 B.W.G.	6 5	to	6 6¼	30.31	to	30.61
Black sheets, No. 31 gage, Japanese	12 10			60.62		
Rails, 60 lb. and heavier	6 10*			31.52		
Rails, light	6 1½			29.46		
				C. per Lb.		
Steel bars, merchant	5 18	to	6 1½	1.28	to	1.30
Steel bars, deformed	5 17	to	5 18	1.27	to	1.28
Beams, Thomas, British standard	5 4	to	5 9	1.12	to	1.14
Channels, Thomas, American sections	6 1			1.31		
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	5 9			1.14		
Angles, Thomas, 3-in.	6 0			1.30		
Ship plates, open-hearth, inspected	7 10			1.62		
Hoop and strip steel, over 6-in. base	6 7½			1.38		
Wire, plain, No. 8 gage	7 15			1.67		
Wire, galvanized, No. 8 gage	9 10½	to	9 12½	2.06	to	2.12
Wire, barbed, 4-pt. No. 12 B.W.G.	11 19			2.58		
Wire nails, base	7 19			$1.72	per	keg
Wire nails, assortments, 1 to 6-in. keg	10 9			2.26		

*Open-hearth steel, 7½s. ($1.82) per ton extra.

Extensive Road Building in Czechoslovakia

PRAGUE, CZECHOSLOVAKIA, May 31.—The Skoda Steel Works at Pilsen has submitted a proposal to the Government for the construction and improvement of about 1000 km. of roads.

The Czechoslovakian Iron Cartel reports that 1928 was the best business year since establishment of the Republic, but a slightly quieter market is expected this year. Steel producers are maintaining average dividends of 7 per cent. In 1928 the Banska i Hutni A. G. reports increased profits with 42 per cent greater output of pig iron, 25 per cent increase in production of steel ingots and 23 per cent increase in rolled products, compared with 1927.

Germans Buy Russian Copper

HAMBURG, GERMANY, June 3.—The Russian Government has resumed operation of the Kaskstan Spasskoje, one of the largest copper smelting plants in Russia, which suspended during the revolution. The capacity of the plant, 6000 to 7000 tons of copper a year, is to be increased to 9000 to 10,000 tons annually. German interests have contracted for the export surplus at lower prices than are quoted by the Copper Export Association in the United States and are seeking additional tonnage from other Russian sources.

Italian Steel Output Gains

ROME, ITALY, May 30.—Steel output in the first quarter of this year was 540,302 tons of ingots, compared with 402,047 tons in the first quarter of 1928. Profits of Italian steel producers are increasing and the average dividend paid for 1928 by the 12 largest producers was 7.8 per cent, compared with 6.3 per cent in 1927. For 20 corporations producing finished iron and steel products the average dividend was 6.6 per cent, compared with 5.6 per cent in 1927. Dividends paid by the three leading automobile manufacturers averaged 11.6 per cent in 1928, compared with 11.2 per cent in 1927.

German Farm Tool Exports

HAMBURG, GERMANY, June 3.—Manufacturers of agricultural machinery report that exports to South America have increased considerably this year. By establishing repair shops and stocks of spare parts and accessories in the principal South American markets, such as Argentina and Uruguay, exports have been doubled. The demand for harvesting machines is particularly good.

Greece to Buy for Railroads

HAMBURG, GERMANY, June 3.—Negotiations are under way between Otto Wolff & Co., Cologne, and the Government of Greece on a 65,000,000 m. ($15,470,000) contract for locomotives, rails and accessories. When the contract is placed, a 10-year credit covering 10 annual instalments will be arranged through a German-American banking group. A Government commission has recommended action on this plan.

To Buy Chromite Deposits

STOCKHOLM, SWEDEN, May 30.—Swedish steel producers are reported to have formed a corporation to purchase and exploit chromite deposits in Asia Minor. The group includes the Avesta Jernverks A. B., Sandvikens Jernverk A. B., Hellefors Bruks A. B., Uddeholms A. B., Fagersta Bruks A. B., Forsbacka Jernverks A. B., Stromsnas Jernverks A. B. The available supply in these deposits is estimated to be sufficient for Sweden's production of chrome-bearing steels for several years.

British Foreign Trade in Iron and Steel Products

(In Gross Tons)

Item	Imports		Exports	
	April	May	April	May
Pig iron and ferroalloys	9,203	7,637	46,718	68,141
Ingots, blooms, billets and slabs	98,206	97,244	638	2,615
Iron bars, rods, angles	19,441	17,442	1,471	3,293
Steel bars, rods, angles	44,482	46,182	21,257	29,934
Structural steel	12,414	9,417	5,971	6,119
Hoops and strips	13,255	17,754	3,960	4,867
Plates and sheets	20,480	19,311	36,483	50,581
Galvanized sheets	.....	.....	66,035	71,723
Tin plate	.....	.....	45,091	57,684
Cast tubes, pipe and fittings	4,267	3,910	10,253	12,330
Wrought tubes, pipe and fittings	8,200	8,915	25,006	33,173
Rails	705	1,093	24,744	32,342
Other railroad material	425	538	10,469	13,897
Wire	8,150	7,134	5,987	8,209
Wire cable and rope	.....	.....	1,881	2,501
Wire nails, including staples	8,135	6,474	214	260
Other wire manufactures	1,090	843	1,560	1,808
Nails, tacks, rivets and washers	1,729	1,364	1,462	1,919
Bolts, nuts and screws for metal	1,507	1,165	2,079	3,126
Iron and steel castings	1,704	1,388	254	352
Iron and steel forgings	810	707	57	124
Other	7,729	8,738	28,214	37,776
Total	261,932	257,256	339,804	442,774

From radiogram received by United States Department of Commerce from American commercial attaché in London.

Building Permits Were Somewhat Abnormal

Attention is called by S. W. Straus Co. to the fact that pending legislation in New York State caused a rush of building permit applications in New York City in March and April, with a corresponding drop far below normal in May. Plans of numerous buildings were filed in anticipation of the change in the law. As a result, April showed more than $259,000,000 in the five boroughs of New York City, whereas the figure for May was only $42,209,198.

Building permits issued in 591 leading cities and towns in May amounted to $307,908,668. This was 19 per cent lower than a year earlier, when the total was $381,786,960. It was also 43 per cent below the high record made in April, 1929, which was $539,423,086. Eliminating New York, the total of the 590 other communities shows a loss from April of less than 5 per cent and a drop from last year of less than 10 per cent.

Reduction in Building Contract Awards

Building contracts in the territory east of the Rocky Mountains in May are reported by F. W. Dodge Corporation at $588,766,000. This is 9 per cent less than in April and 12 per cent less than a year ago. The most significant decline occurred in the district covering New York State and the northern part of New Jersey. In the territory outside of this district the decline from April was less than 2 per cent, compared with a normal seasonal decline of 4 per cent.

Residential building, which for several years has been running about 40 per cent of the total, declined in May to 33 per cent, representing $192,015,000. Public works and utilities accounted for $139,388,000; commercial buildings, $86,471,000; industrial buildings, $80,769,000; and educational buildings, $38,195,000.

In five months contracts have reached $2,485,656,000, a decrease of 11 per cent from the $2,794,401,000 in the like period of last year. New work reported in the contemplated stage in May was $847,157,000. This is 10 per cent less than in April and 4 per cent under May, 1928.

Citroen Buys Axles

American-made automobile axles will be used in motor cars made by the Citroen Co. of Paris, which has just placed an order for 15,000 sets with the Columbia Axle Co., Cleveland.

Four new members are announced as added to the list of the National Metal Exchange: James B. Reddy, George Bultmann, and Arthur A. Glass, the latter with the Diamond Drill Carbon Co., and Andre Paulve of Paris, France.

This Issue in Brief

Floor space is saved by back-and-forth movement of conveyors in new automobile body plant. Parallel assembly lines are arranged in such proximity that no waste space is permitted.—Page 1706.

* * *

Where strength and toughness are required, low-manganese steel has many uses. It has high impact value. When properly made and heat treated there is no tendency toward brittleness.—Page 1691.

* * *

For high-strength gray iron castings, the cupola should have the correct amount of air to combine with the coke to give a neutral or very slightly oxidizing atmosphere. The lower the blast pressure consistent with correct volume, the hotter the metal obtained.—Page 1701.

* * *

Radiation is the principal agency for transfer of heat in open-hearth furnaces, according to German investigator. However, convection is found to be of greater importance than was formerly believed.—Page 1702.

* * *

Spray booth fire danger is reduced by removing fans from the exhaust line, so that motor sparks cannot come in contact with either the contents of room or spray booths.—Page 1707.

* * *

Welding permitted by building codes in many cities. Unit stresses are: Shear on minimum section through weld, 11,300 lb. per sq. in.; tension, 13,000 lb.; compression, 15,000 lb.—Page 1707.

* * *

Wholesale prices dropped again in May. Average was 95.8, one point below April. May, 1928, average was 98.6.—Page 1711.

Punch press department operates with scrap allowance of only 0.35 per cent. This figure was exceeded only twice for entire year in cash register plant.—Page 1687.

* * *

Cuts cost of hardening small tools by placing them in bored carbon block installed in gas furnace. Scale is prevented and the tools come out true to size.—Page 1708.

* * *

Moderate price declines predicted by Dr. Haney. Some recession in demand may be expected, he says, and declines are probable between now and fall.—Page 1711.

* * *

Die storage simplified by using double racks, eight shelves high. Each shelf has seven separate sections or bins. Thus each die has a separate compartment. Large dies are stored on the lower shelves.—Page 1689.

* * *

Ultimate strength of low-carbon steel is raised about 100 lb. by each 0.01 per cent manganese added. The same amount strengthens medium-carbon steel by 250 lb. per sq. in. Addition of a moderate amount of manganese does not cause a proportionate loss in ductility.—Page 1692.

* * *

Case hardened parts of low-manganese steel are usually superior to those made of plain steel. Manganese of 1.25 to 1.75 per cent gives a sound, hard case, and a stiffer, tougher core.—Page 1692.

Heating steam power boilers with blast furnace gas is not ordinarily economical. Of four uses for this gas, heating boilers for production of power is last in preference.—Page 1700.

* * *

High sulphur for machinability can be had without brittleness by using more manganese. The manganese counteracts the brittleness to be expected from unduly high sulphur.—Page 1692.

* * *

Pays punch press operators for set-up. Operators in cash register plant set up all jobs, under supervision of job setter and job foreman. For this work operator is paid a "set-up price," which enables him to earn as much money setting up a job as in operating his press.—Page 1688.

* * *

Welds made with rods containing 0.80 per cent manganese produce a joint with a strength of 58,000 lb. per sq. in., while only 47,000 lb. per sq. in. can be expected from a weld made with a Norway iron rod.—Page 1692.

* * *

Hydraulically operated machines are popular in locomotive plant. Water is distributed to machines through high-pressure mains, but for some types of work the motor-driven hydraulic pump is an integral part of the machine.—Page 1696.

* * *

Tin market will probably decline during remainder of 1929 "if left to its own devices," says authority. But if the London "group" continues to take metal out of the market, it may be possible to keep the statistical position from further deterioration.—Page 1717.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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General Trade and Steel

COMMENT during the last few weeks on the unprecedented activity in steel has emphasized the point that steel was doing better than trade in general. This leaves the question whether steel has made a permanent advance in its usefulness, relative to other things, or is merely tardy in getting off its exceptionally high level of activity. Probably the answer is, "Both." By any long-range comparison it can be seen that steel tonnage has been increasing more than total trade activity. For example, relative to freight ton-mileage steel has always made a favorable comparison. For a long time, and up to the war, freight ton-mileage doubled approximately once in 12 years. Pig iron doubled in ten years and steel in less than ten years. Since the war steel has been increasing distinctly more than freight ton-mileage, which has been not much more than stationary.

As to time, it was observed before the war that toward the end of a depression steel was always the first big thing to pick up, and if it was not always the last to slow down it always made a good strong finish. There was the impressive experience in connection with the panic of late October, 1907. There was a sudden and sharp cramping down in everything, and certainly there must have been a good bit going wrong for months before the panic. But the monthly blast furnace report of THE IRON AGE showed October to be the record high month. There were no monthly steel production reports then. As to the depression of 1913, there were somewhat poor times by the middle of that year, but iron and steel held up very well in tonnage practically through October.

In the past two months general trade sentiment outside the steel industry has been slightly less favorable, all apart from any change ascribable to summer. There are some statistical evidences that the business situation, while it has been strong, has not been above a general trend line marking the progress of the country with its increasing population and disposition to do new things. Merely for examples, freight car loadings since the first of the year have been below those in the same period of 1927, although above other years, and 1927 is not a year anyone would pick out for this year to pattern after. Portland cement, which hitherto has been growing rapidly, shows 7.6 per cent decrease from last year, comparing shipments in the first five months.

Steel used to be quite barometric in foreshadowing business improvement. Whether or not it has been so of late, there has never been any serious contention that steel was barometric of downturns in general business. Accordingly we do not take the remarkably sustained activity in steel at the present time, with so little of the yielding to seasonal influence that was plainly seen in most other years, as an index to the future of trade in general. Rather the course of reasoning should be from general trade to steel.

Regional Trends Need More Study

JUST as an industrial establishment ought always to know that it is keeping up with the procession, so the industrial community should be sure it is holding its own. Too few individual enterprises are thoroughly posted as to their business health, but the industries of a State, to take an important geographical unit, are not only without precise knowledge of their position in comparison with like groups in other States, but have no means of getting the facts. Not until there are unmistakable signs of a slipping is there any concern. Then the territory in question is under the handicap of impaired prestige.

Relatively small industrial centers have their business organizations. These operate often to survey the local situation and analyze such important matters as the balance in the labor market. At times fears of competition for labor come up to deter expansion in the community and even prevent the bringing in of new industries. But neither local nor State organizations can tell how the several industries may be doing in comparison with those in like lines in other sections.

Profits made in times of general prosperity may beget an unwarranted confidence in the ability of a locality or a district to maintain its position when demand falls below normal. Much could be done through regular and group collection of financial as well as production and consumption statistics. In this way individual companies and groups may be forewarned of tendencies which after gaining momentum might be difficult if not impossible to stop.

There is need also for studies of a geographical group's own economic position in respect to the major industries. Basic economic conditions or advantages of location may prevent retrogression, but oftentimes the backward movement is due to indifference or overconfidence and could have been averted were the danger foreseen.

Business today is more statistically minded than it has ever been; but there is still a woful ignorance of the value of economic analysis. Commercial organizations may well take a leaf from the book of the banking community. The latter knows well that a balance sheet does not tell the whole story and takes more and more account of other indicators of well-being in determining the basis for credit, such as efficient equipment, good morale and position in the competitive scheme.

Every trade organization is striving for its industry as a whole and only indirectly and infrequently

does the individual company discover where it stands. But this matter of regional status rather calls for joint action by chambers of commerce in the particular territory, to disclose the state of health not only of the members of any one industry but that of all industries within its borders in comparison with those of the country at large. Only recently the migration of industry has assumed major importance in the studies of the Chamber of Commerce of the United States and within the month the Metropolitan Life Insurance Co. has given out the results of its special survey of the subject. The time is ripe, therefore, for such a movement as is here suggested and the immediate question is, who will take the initiative?

Damocles Up to Date

HEAVY hangs over the head of the corporation employee the uncertainty attending industrial mergers. Economy in personnel is one of the advantages claimed for consolidations of competing companies. Sales forces are cut down, managerial staffs are reduced, fewer important executives are required.

Ordinarily the topmost executives have nothing to fear; they are often principals in merger negotiations and can be counted on to look after their own interests. If they are retired from active business life, they are compensated by what they have received for their properties, if sold outright, or by blocks of stock in the consolidated organization and the reasonable assurance of increased income. The rank and file among workers are also relatively secure and in the long run may conceivably benefit from a merger.

The lot of the captains, lieutenants and sergeants of the industrial army is not so satisfactory. After years of faithful and efficient effort they may suddenly feel the modern sword of Damocles, not infrequently when they are too old to obtain or adapt themselves to new employment at salaries comparable with those they have had.

Whether a man labors with his hands or his brain, he places a high value on security in his job. When it is threatened, his morale is shaken. Loyalty, initiative, perseverance lose their meaning. He begins to think he has become a pawn on the chess board of financiers, knowing not what move will throw him into the discard.

The hope of surviving the process of elimination has been dimmed by the feeling that just rewards do not always go to the deserving. This has been accentuated because the merger movement has brought the ascendancy of the banker, who thinks in terms of profits and capital structure rather than in terms of men. If he has any interest in personnel, it is in the chief executives. He is one who complains of a shortage of executives of the caliber required by modern large-scale enterprises. He is on the lookout for supermen, little heeding how much the reputations of industrial leaders often rest on the work of highly capable subordinates.

Financial statements, business statistics, management theories and scientific principles do not tell the whole story. We are still living in a world of people. Quality of mind, morals and morale, ambition and hard work all determine how the concepts of the financier are translated into actualities.

Personnel policies, now recognized as essential to all large organizations, are proving effective in looking after the privates in industry. Is it not time they were applied to the captains, lieutenants and sergeants?

Tempering Copper

IT is a perpetual source of wonder to us how the non-technical press is intrigued by the subject of tempering copper and "making it as hard as steel." This is believed to have been a metallurgical art that was possessed by the ancients, but in some way lost, to the detriment of human welfare, and consequently is worthy of research and recovery.

This is more or less akin to the legend of lost mines, of outcropping seams of solid gold accidentally discovered by a perishing prospector, who had to make haste to get away in order to save his life and never again was able to find the miraculous discovery. However, ever afterward there have been from time to time reports that the Peg-leg or Gunsight mines have been found again. Many a bearded pard, accompanied by his faithful burro, has been on the quest.

So it is with the rediscovery of the hypothetical lost art of tempering copper. Every so often is published the news that a blacksmith or a pipe-fitter, or a garage mechanic in Kalamazoo, Medicine Hat or Timbuctu, has accidentally made the rediscovery, with the promise of revolutionizing the use of copper in industry. And the daily press swallows it.

We do not believe that the ordinary telegraph editor knows anything about the subject, or indeed has anything more than a vague knowledge of what copper is anyhow. But what is the process of local representatives of the Associated Press putting such reports on the wires? We suggest to managing editors that they get answers to the following questions:

1. Did the ancients really have an art of tempering copper?

2. If it were now possible to temper copper, why should anyone want to do it?

3. What would be the use of making copper as hard as steel when copper costs 18 cents a pound and steel can be had for 3 cents?

The ancients did not possess steel, but they had copper and made bronze; and no doubt the warriors of Egypt and of Ur prized a good bronze battle-axe. But we venture to think that they would rather have had the common steel axe of the Michigan lumberjack. Also, we are inclined to think that if any article of tempered copper were discovered the metallographers of today would know how to examine it and the metallurgists how to reproduce it.

Business Activity and Prices

THE past few years have been a period of business activity in the United States unparallelled by anything in the past, if both intensity and duration be considered, but without rising prices. The economists have been puzzled, in view of the old rule that activity and prosperity were accompanied by rising prices, and in the earlier part of the period were disposed to deny the "prosperity" as a way out of the dilemma.

Evidently we are in a new era in the commercial development of the country. The figures are convincing, as to the fact of price steadiness in face of great

activity. The Federal Reserve Board's index of "industrial production" (preliminary) is just issued at 122 for April, the highest on record. This is adjusted for seasonal variation, and compares with 119 for March and 117 for both February and January, while the average for last year was 110, and the average of 1923 to 1925 inclusive, taken as the base period, was 100.

With such a rise in the volume index, the Bureau of Labor's index of wholesale prices has been almost stationary thus far this year, and indeed showed a slight decline for April. To make a direct comparison between prices and industrial production, April prices stood at 96, taking 1923-4-5 as base, while industrial production was 122. The divergence is 26 points, but some deduction from that must be made to allow for the growth of the country, in population and otherwise.

It might be argued that prices are pulled down by our rapid gain in manufacturing efficiency. If so, one would naturally expect to see some divergence between the course of raw materials and finished products, but that is not in evidence. For two years past the Bureau of Labor has compiled separate index numbers for raw materials, semi-manufactured articles and finished products. For May of three years these index numbers (1926 base) stand as follows:

May	Raw	Semi	Finished
1927	93.9	96.0	93.6
1928	101.4	98.6	97.1
1929	95.3	95.1	96.4

Here we have no materially different trend in the three classes in the space of two years. It appears that the vogue of close prices despite great activity is general. What producers and distributers may well consider now is how prices will be influenced in a period of lessening activity, for we cannot expect activity to be increasing all the time. As things are constituted there must be occasional recessions. We have yet to have opportunity to observe, in this evidently new era, whether the principle of prices not advancing with increased activity will have a counterpart in their maintenance under decreased activity. Some fluctuations cannot be avoided, but when sellers have had little or no gain from increased activity they can well argue that it's a poor rule that does not work both ways.

CORRESPONDENCE

Electrical Test for Fatigue of Steel

To the Editor: I have read with interest the abstract in the June 6 issue of THE IRON AGE, entitled "Fatigue Limit of Steel Found by Rapid Electrical Test," based upon experimental data by S. Ikeda, research laboratory, Japanese Government Railways, Tokio. Were it possible to obtain an accurate endurance limit of a material by measuring its electrical resistance, the short-time endurance test problem would be solved. Unfortunately, Mr. Ikeda's data are not extensive enough to warrant the belief that this end has been achieved, nor do his results agree with those of other investigators.

From tests upon five different carbon steels, Mr. Ikeda determined the endurance limits by an electrical test. As an example, a 0.69 per cent C steel was found to have an endurance limit of 23,100 lb. per sq. in. To verify the assumption that the above named figure represents the endurance limit, another test bar of the same steel was run as a rotating beam, with a maximum stress of 21,600 lb. per sq. in. for 30,160,000 cycles without fracture. A similar test piece cut from a bar with a carbon content of 0.88 per cent was loaded to a stress of 29,000 lb. (i. e., higher than the endurance limit as found by electrical methods, yet much below the true proportional limit), and broke after 6,350,000 revolutions. All bars, with varying carbon content, were annealed at 900 deg. C. for one hour and were allowed to cool in the furnace.

It does not seem plausible that two specimens, each of a different carbon content, each with a different microstructure, could alone establish the veracity of the endurance limits obtained by the electrical method. It does not seem a very fair comparison, even though the results of the two methods of test compare very favorably. Two specimens of the same heat treatments and same carbon content would scarcely provide enough data to determine accurately the endurance limit by a rotating beam test. With both variables changing, it seems even less accurate.

The ratios between endurance limit and ultimate strength for the five steels tested by the electric method range from 25 to 30 per cent. It is generally accepted that this ratio for ferrous metals should be between 35 and 50 per cent, these values being determined by an actual fatigue test to failure.

Thus it does not appear that the short-time electrical test has replaced very accurately the present time-consuming method of fatigue testing.

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Rolling Tests of Steel Plates

To determine the flow of metal in a plate rolled under a loaded cylinder, tests in some detail were made by Prof. Wilbur M. Wilson at the engineering experiment station, University of Illinois. The information desired was primarily that which would be of value to the designer of rolling bascule bridges and similar structures. It is stated as one stipulation that the working load for a sole plate should be a function of the minimum load which will produce permanent deformation.

These tests are covered in great detail in Bulletin 191 of the experiment station, which has many illustrations. It was concluded that when a loaded cylinder rolls over a plate the deformation of the plate is influenced by the motion as well as by the pressure. Plastic flow of the material under a rolling cylinder is materially different in character from the elastic deformation under the same cylinder at rest. The load required to produce longitudinal flow appears to increase with the thickness of the plate up to about 4 in., which seems to be the limiting condition in this respect.

For thin plates the load required to produce lateral flow increased with the plate thickness, but the reverse was true for thick plates. A difference in this respect was found as the cylinder diameter was varied. The bearing capacity of a plate on which a cylinder rolls is greatly affected by slight changes in the physical properties of the material. This bearing capacity in a steel casting of medium grade and in steel of structural grade can be greatly increased by proper heat treatment.

A design formula was developed as a result of the tests, which gives approximately two-thirds of the minimum load required to produce flow under continuous rolling.

Many to Be Heard on Metal Tariffs

Senate Hearings Will Be Started Next Monday — Steel Institute to Ask for Free Entry of Manganese Ore

WASHINGTON, June 18.—About 75 applications for hearing before the subcommittee on metals of the Senate Finance Committee had been received up to today. The tariff hearing before this subcommittee has been set to begin next Monday. The number of applications promises to be increased before that time, so that it is expected that the hearings on the metal schedule will last two or three days or longer. In line with its policy, the Finance Committee is not giving out the names of applicants until shortly before the hearings in which they are interested have begun. It is understood the names of the applicants to be heard on the metal schedule will be announced on Saturday of this week.

The number to appear before the Senate subcommittee on metals, of which Senator Reed of Pennsylvania is chairman, may be as great as the number which appeared in connection with hearings on the metal schedule before the House Committee on Ways and Means. It is known that those who have already applied to be heard will present testimony on a wide scope of products.

The general iron and steel rates, it is said, will be presented by John A. Topping, vice-president of the American Iron and Steel Institute and chairman of the Republic Iron & Steel Co. Mr. Topping represented the industry as vice-president of the institute before the Ways and Means Committee.

It is known that the institute will make a strong effort to have the duty on manganese ore removed and duties on ferroalloys reduced. At the same time the American Manganese Producers' Association will make an effort to have the duty of 1c. a lb. of contained manganese increased to 1½c. per lb. The domestic crucible steel industry will be represented by Dr. John A. Mathews, it is said. Domestic pig iron producers are understood to be prepared to request a duty of $3 per ton on that product.

Cast Iron Pipe Rehearing Denied

Interstate Commerce Commission Upholds Previous Decision Establishing Mileage Scale on Shipments

WASHINGTON, June 18.—The Interstate Commerce Commission has denied the petition of Southern railroads and of intervening Southern cast iron pipe manufacturers for a rehearing of the so-called Krupp Foundry Co. case, in which division 3 of the commission on Dec. 31, 1928, fixed a mileage scale of rates for cast iron pipe from Lansdale and Quakertown, Pa., to points in Maryland, Delaware, Virginia, North Carolina, South Carolina, Tennessee, Kentucky, Georgia and Alabama.

This means that when the railroads have worked out the new tariffs, Northern foundries will be placed on a more competitive basis with Southern foundries at some points in the South and Southeast, while Southern foundries will be obliged to pay higher rates to many points in the North.

The order of last December held that the rates from Lansdale and Quakertown were prejudicial to the Krupp Foundry Co. and other Northern producers, and that rates from Southern foundries to many points in the Northern States were unduly preferential to the Southern foundries.

Low freight rates from the South to the North, to which the Krupp company and others objected, were established decades ago when Southern railroads helped to foster the upbuilding of the cast iron pipe industry in the Birmingham district. The commission in its original order held that the Southern producers are now favored unduly by such rates in that 60 per cent of the cast iron pipe producing capacity is in the South.

In denying the petition of the Southern roads for a rehearing, the commission entered an order reopening the case on its present record, which means that there will be no further hearings.

The decision of division 3, providing for a mileage scale, which was an extension of the Jones & Laughlin Steel Corporation scale, did not carry an order with it, but the division said that the railroads would be expected to publish rates in conformity with its findings within 90 days from service of the report. The mileage scale, however, was not filed, the Southern carriers objecting to it. Northern carriers and producers in their petitions asked that the Southern lines be made to file the new scale, while the Southern carriers with Southern cast iron pipe makers asked for reopening and reconsideration of the case by the commission.

Denial of their petitions by the commission as a whole means defeat for the Southern carriers and producers, while reopening for reconsideration without further hearing ordered by the commission leaves the case where it was originally. The nature of reconsideration by the division remains to be seen, but it has been construed as promising amalgamation of the case with the general investigation of the iron and steel rates throughout official classification territory, though it would involve rates in the South, whereas the general inquiry on iron and steel rates, made under the Hoch-Smith resolution, was confined to points north of the Ohio and Potomac rivers and east of the Mississippi river.

The tentative report in the general rate case proposed a mileage scale for manufactured iron and steel products, a proposal to which objection had been made by some cast iron pipe manufacturers, and cast iron pipe was not included in the inquiry. It has been stated, however, that it could be linked with that proceeding.

Arguments in the general iron and steel case were made last January and it is reported that the decision may be handed down soon.

Toledo Scale Organizes Subsidiary

Approximately 50 devices have been developed and marketed by Toledo Scale Co. for control of manufacturing operations, which while utilizing weight measurements can hardly be classed as scales, and could not effectively be marketed by an organization selling to retailers. Consequently Toledo Scale Co. has organized Toledo Precision Devices, Inc., to take over this work of development, manufacturing and sales, and has transferred to it the skilled engineers and craftsmen who have been working on these specialties in the past.

Machines already developed include machines to sort connecting rods, balancing machines, machines to find center of mass, to measure the expansive force of piston rings, machines to control the amount of sand on sandpaper, the percentage of moisture in cloth, the thickness of paper and the purity of water. H. D. Bennett, president of both organizations, announces that a model manufacturing plant will be built for Toledo Precision Devices, Inc., which will incorporate many ideas gained from various comprehensive studies of industrial fatigue.

Steel Works Employment Up

WASHINGTON, June 18.—Making a gain of 1 per cent, iron and steel employees in April totaled 284,498 as against 281,809 in March, according to reports received by the Department of Labor from 209 establishments. The weekly payroll rose 2.6 per cent to $5,558,428 from $9,317,929. The number of iron and steel workers increased 4.9 per cent and the amount of the payroll increased 12.6 per cent in April of the present year over April of last year.

Iron and Steel Markets

Steel Demand Shows Vitality

High Production Rate Promises to Extend Into July— Semi-Finished Steel Sold for Third Quarter at $35 —Sheet Prices More Flexible

THE steel industry is reducing its backlogs in various products, but output promises to continue virtually at capacity for the rest of this month and, according to forecasts of the trade, will not drop below a 90 per cent rate in July.

The falling off in steel consumption is confined mainly to the automotive and building industries. Motor car production, however, is still larger than usual for this time of the year. The decline from peak specifications in automobile steels is estimated at 15 per cent, which represents only 3 or 4 per cent of total finished steel output. Plans to increase production, after the bringing out of new models next month, may soon be reflected in a rebound in steel requirements.

The recession in general building activity has been evident in reduced sales of merchant pipe, but has not yet shown itself in structural steel work. The week's awards of fabricated steel, at 45,000 tons, were in good volume, although far short of the record total of the preceding seven days. Computed bookings for May, reported by the Department of Commerce, were 346,500 tons, compared with 334,950 tons in April. The total for the first five months, at 1,582,350 tons, set a new record, exceeding the previous high mark, established last year, by 24 per cent.

In other consuming lines demand for steel is unusually well maintained. Farm equipment makers thus far this year have taken 14 per cent more tonnage than in the corresponding period of 1928, and give few indications of reducing their requirements. Five light cruisers, on which the Navy has just taken bids and estimates, call for more than 30,000 tons of steel. Pittsburgh district barge builders have booked orders for 10 additional vessels, and railroad equipment companies have received contracts for 1000 box cars from the Boston & Maine and 121 passenger service cars from the New York, New Haven & Hartford.

The Southern Pacific has bought 33,860 tons of rails, of which 9000 tons were placed with the Colorado mill and 12,430 tons each with the Tennessee Coal, Iron & Railroad Co. and the Bethlehem Steel Co. The Hocking Valley is inquiring for 2900 tons and other roads may order supplementary tonnages, but the next major rail buying movement will not set in until next fall and meanwhile rail mill operations, now at 85 per cent at Chicago, will soon be cut down.

Line pipe bookings have been augmented by the placing of 15,000 tons of 12-in. for a 125-mile gas line from Jennings field in Zapata County, Tex., to Monterey, Mexico. A 500-mile gas line to be built from Saskatchewan to Winnipeg, Manitoba, will require 47,000 tons of 10-in. pipe.

The large mileage of gas lines built in the past year has resulted in a sharp increase in the sale of gas stoves, which in turn has been translated into larger consumption of sheets and other steel products.

The increasing diversification of demand helps explain the strong position of steel producers and the failure of some of them, so far at least, to experience any decline in specifications. The releases of a leading sheet maker are still running considerably ahead of shipments, which are expected to set a new June record. In the Chicago district, mill deliveries show little improvement in any product and the shortage of semi-finished steel is as acute as 60 days ago. In other areas hot weather, rather than the supply of unfinished steel, is becoming the leading factor in determining the schedules of finishing mills, particularly sheet plants.

A number of third quarter contracts for semi-finished steel have developed prices of $35 for sheet bars, billets and slabs. This figure is $1 a ton lower than the recent spot quotation, but is the same price that governed most of the second quarter tonnage in sheet bars and represents a concession to non-integrated sheet mills, which protested against paying more for their raw material when they were unable to obtain higher prices for their finished product. On billets and slabs the new price represents an advance of $1 a ton over the figure that ruled on most current quarter tonnage.

In most finished steel products contracts are being closed for the coming three months at recently announced prices. Black sheets, however, have been sold to large consumers in the automobile field and to steel barrel makers at 2.85c., which is $2 below the more general market quotation but $2 higher than was paid by some tonnage buyers for most of their second quarter requirements. Similarly, contract prices on galvanized sheets range from 3.60c. to 3.70c. Plain wire, although fairly steady in most markets, has been shaded $2 a ton.

Pig iron inquiries for third quarter are more numerous, but nothing resembling a broad buying movement has set in. Alabama furnaces continue to press for business in the North and East. For delivery in the Chicago district they are quoting $14.50, base Birmingham.

THE IRON AGE composite prices are unchanged. Pig iron, at $18.63 a gross ton, is $1.40 higher than a year ago; finished steel, at 2.412c. a lb., is up $1.42 a net ton.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous. Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	June 18, 1929	June 11, 1929	May 21, 1929	June 19, 1928
No. 2 foundry, Philadelphia	$21.76	$21.76	$21.76	$20.76
No. 2, Valley furnace	18.50	18.50	18.50	16.75
No. 2 Southern, Cin'ti	18.69	18.69	18.69	19.69
No. 2, Birmingham	15.00	15.00	15.00	16.00
No. 2 foundry, Chicago*	20.00	20.00	20.00	18.00
Basic, del'd eastern Pa	20.25	20.25	20.25	19.00
Basic, Valley furnace	18.50	18.50	18.50	15.35
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	18.76
Malleable, Chicago*	20.00	20.00	20.00	18.00
Malleable, Valley	19.00	19.00	19.00	17.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.01
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	*35.00*	36.00	36.00	32.00
Sheet bars, Pittsburgh	*35.00*	36.00	36.00	33.00
Slabs, Pittsburgh	*35.00*	36.00	36.00	....
Forging billets, Pittsburgh	*40.00*	41.00	41.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	38.30
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb	1.85	1.85	1.85	1.85
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.85
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.85
Bars, New York	2.29	2.29	2.29	2.19
Tank plates, Pittsburgh	1.95	1.95	1.95	1.85
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.85
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	3.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	June 18, 1929	June 11, 1929	May 21, 1929	June 19, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.65
Sheets, black, No. 24, Chicago dist. mill	3.05	3.05	3.05	2.75
Sheets, galv., No. 24, P'gh	3.60	3.60	3.60	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.80	3.80	3.80	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.20	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.40	2.20
Wire nails, Pittsburgh	2.65	2.65	2.65	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh	2.50	2.50	2.50	2.50
Plain wire, Chicago dist mill	2.55	2.55	2.55	2.55
Barbed wire, galv., P'gh	3.30	3.30	3.30	3.35
Barbed wire, galv., Chicago dist. mill	3.35	3.35	3.35	3.40
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$18.25	$18.25	$17.75	$14.50
Heavy melting steel, Phila	16.00	16.00	16.50	13.50
Heavy melting steel, Ch'go	15.00	15.00	15.25	12.50
Carwheels, Chicago	14.25	14.25	14.50	13.00
Carwheels, Philadelphia	16.00	16.00	16.50	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.00	14.25
No. 1 cast, Philadelphia	16.50	16.50	16.50	16.00
No. 1 cast, Ch'go (net ton)	*14.50*	15.00	15.50	14.00
No. 1 RR. wrot., Phila	16.00	16.00	16.00	13.50
No. 1 RR. wrot, Ch'go (net)	13.50	13.50	14.00	11.25
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$2.60
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	14.87½
Electrolytic copper, refinery	17.75	17.75	17.75	14.50
Tin (Straits), New York	44.62½	44.50	43.75	46.62½
Zinc, East St. Louis	6.65	6.65	6.65	6.15
Zinc, New York	7.00	7.00	7.00	6.50
Lead, St. Louis	6.80	6.80	6.75	6.15
Lead, New York	7.00	7.00	7.00	6.30
Antimony (Asiatic), N. Y.	9.00	9.00	9.00	9.62½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Continued Large Consumption of Steel Assures a High Rate of Mill Activity Through July

PITTSBURGH, June 18.—Large tonnage releases on many steel products as the industry enters the second half of June are still a source of surprise to some market observers. Unusually heavy activity during the remainder of June and all of July is now virtually assured in this and nearby districts.

Shipments to the automobile plants are undoubtedly falling off, but, with the two largest companies in that industry maintaining their high production schedules, the decline in steel consumption is not yet so marked as is usually the case two months earlier in the year.

Tin plate shipments are slipping rather sharply. On the other hand, demand for sheets is being held up by the heavy requirements of electric refrigerator makers, steel drum manufacturers and other large consumers, and June specifications of one large producer are far ahead of shipments.

The oil industry is taking steel at a somewhat better rate, and the requirements of railroad equipment makers, barge builders and other leading consuming industries in this district show little or no reduction.

Mill operations show virtually no change. Open-hearth furnaces, still at physical capacity, with the exception of occasional interruptions for repairs, are now fully supplying the needs of finishing mills, and the production of Bessemer steel is probably at its peak point for the year. This is traceable partly to heavier pipe mill requirements and partly to the more frequent substitution of Bessemer for open-hearth steel.

Most of the available sheet mills in this and nearby districts are running full, occasionally with extra turns to catch up on deliveries. Tin mill operations now average about 90 per cent.

Structural awards in the district have been heavy in the past week, having included 6850 tons for a railroad bridge over the Monongahela River, 4000 tons for a Pittsburgh hospital and 2500 tons for a pipe mill at Youngstown. Ten barges, recently placed by a Pittsburgh sand company, will take 1500 tons of plates.

A gas line in Texas, requiring about 15,000 tons of pipe, has been placed with a Youngstown mill.

Maximum prices recently announced for third quarter are applying on business placed for that period, with the possible exception of black and galvanized sheets. On black sheets, deviations of $2 a ton to large buyers are not infrequent, and jobbers are benefited similarly on the galvanized product.

Sellers of semi-finished have not yet opened their third quarter books, but are expected to make no change from the present contract price in covering the requirements of their regular customers.

Pig Iron.—Shipments against contracts are moving steadily, but the market is still very dull. No sizable third quarter inquiries have come out in the last week, and sales have been

confined largely to lots of less than 100 tons. Second quarter contracts of many consumers will be fully specified in another fortnight, and sellers in the district expect active buying at that time. However, at least one large consumer in the Pittsburgh district has sufficient foundry iron on its books to last well into July, and in other cases buying may be delayed for another month. In the meantime, reports are still current that steel companies in the district have quietly covered their third quarter needs. The Valley market is very quiet. Furnace stocks are at a minimum. In the absence of important buying, prices are unchanged at $18.50, Valley, for basic and foundry iron and $19 for Bessemer and malleable. The Pittsburgh district furnace is quoting f.o.b. prices 50c. higher for delivery to Allegheny County points.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—With the supply of unfinished steel now better adjusted to demand than it has been for about two months, interest is now centered largely on third quarter prices. Makers of billets, slabs and sheet bars in the immediate Pittsburgh district have not yet opened their books for third quarter contract business.

However, in contiguous districts a few makers have stated that they will accept third quarter contracts at $35. This is the price which applied on second quarter contracts for sheet bars, but is $1 a ton higher than the second quarter contract price on billets and slabs. It is probable that the $36 quotation will be retained on spot tonnages. There has been considerable objection to the $36 price on sheet bars from non-integrated sheet and strip makers whose prices on the finished products are to be no higher for third quarter than in this quarter. It will probably be a month or more before second quarter contract tonnages are fully specified, and neither buyers nor sellers of crude steel are now particularly anxious to place business. Makers of wire rods have opened their books for third quarter, reaffirming the former price of $42, Pittsburgh or Cleveland, and considerable business has already been closed for that period. The supply of wire rods is sufficient to meet demand and deliveries are fairly satisfactory.

Bars, Shapes and Plates.—Specifications are holding up fairly well, but new business leaves something to be desired. Third quarter contracts are coming in slowly, but mills are not exerting much pressure for business in view of apathetic consumer interest. Deliveries show little, if any, improvement. On plates, some mills are still extending their commitments. An order for 10 barges, placed by a Pittsburgh sand company with two builders in this district, will require 1500 tons of plates. Specifications from the railroad car builders are steady, and a diversified demand is still coming from other consuming industries. Demand for shapes is only fair, but fabricating shops in this territory have recently taken 4000 tons for a Pittsburgh hospital and 2500 tons for a pipe mill in Youngstown. A few fabricating shops are extremely well engaged, but the general average is not high. Prices on fabricated steel are none too strong, but the mill price on shapes seems to be fairly firm. Delivery promises for bars are not as extended as they were a month ago. Reinforcing bars are quite active, but shipments are now promised in about four weeks, as against five to six weeks early in May.

Wire Products.—Demand for wire thus far in June has been about equal to that of May and some mills report a slight improvement. A slight falling off in specifications for manufacturers' wire is in evidence, but this is offset by improvement in the requirements of the jobbing trade which is moving heavy tonnages of barbed wire, fencing and kindred products. Nails are about up to expectations, although makers are now recognizing the diminishing demand. Talk of price cutting is heard occasionally on both nails and wire, but cases seem to occur only in outlying competitive districts. In the immediate Pittsburgh territory, quotations of $2.65 to $2.75 a keg, Pittsburgh, on nails and 2.50c. to 2.60c. a lb. on plain wire, are being adhered to.

Tubular Goods.—Line pipe orders were swelled during the last week by the placing of about 15,000 tons of 12-in pipe for a 125-mile gas line to be laid from Zapata County, Tex., to Monterey, Mex. The business went to a Youngstown mill. Lap-weld mills in Pittsburgh and nearby districts are now considerably better engaged than they were a month or six weeks ago and seamless capacity is also being well utilized. Demand for mechanical tubing and boiler tubes is holding up well, although specifications for the former products from the automobile industry are not quite so heavy as they have been. Standard pipe is moving better, but sales are being maintained at the expense of considerable sales effort, and business is not up to last year's level.

Sheets.—New business in sheets is still running ahead of shipments. In spite of reported declines in automobile production, the requirements from that industry are far greater than usual at this time of the year. The electric refrigerator industry is proving to be a heavy user of sheets and its tonnage requirements this year have shown considerable gain. Delivery promises on blue annealed sheets now average about six weeks, and the best shipments on black sheets are not less than four weeks. The special finishes are heavily sold

The Iron Age Composite Prices

Finished Steel

June 18, 1929, 2.412c. a Lb.

One week ago	2.412c.
One month ago	2.412c.
One year ago	2.341c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.391c.,	Jan. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

June 18, 1929, $18.63 a Gross Ton

One week ago	$18.63
One month ago	18.71
One year ago	17.23
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.29,	March 19
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c. to 2.15c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.95c. to 2.00c.
F.o.b. Cleveland	1.95c. to 2.00c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.15c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c. to 2.10c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrow Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.20c. to 2.30c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c. to 2.15c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c. to 4.35c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.65 to $2.75
Galvanized nails	4.65 to 4.75
Galvanized staples	3.35 to 3.45
Polished staples	3.10 to 3.20
Cement coated nails	2.65 to 2.75

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.50 to $2.60
Annealed fence wire	2.65 to 2.75
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.10 to 3.20
Barbed wire, galv'd	3.30 to 3.40
Barbed wire, painted	3.05 to 3.15
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.67c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c. to 2.95c.
No. 24, f.o.b. Chicago dist. mill	3.05c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.60c. to 3.70c.
No. 24, f.o.b. Chicago dist. mill	3.80c.
No. 24, del'd Cleveland	3.79c. to 3.89c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.75c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 28, f.o.b. Pittsburgh	4.10c.

Long Ternes

No 24, 8-lb. coating, f.o.b. mill	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. carry the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅞ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Bebond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard are gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

up, and, with expected curtailment on account of hot weather, mills are now largely committed until Aug. 1. A few turns were lost last week on account of the heat, and this is becoming a more important factor in determining mill schedules than the supply of crude steel. The leading interest is operating its mills this week at about 97 per cent of capacity, as compared with 94 per cent last week, and independents are probably fully equalling this rate. Uncertainty still pervades the price situation in view of the fact that large buyers of black sheets have placed third quarter contracts at 2.85c., Pittsburgh, which, however, in the case of certain automobile and body companies, is $2 more than was paid in the present quarter. On the general run of business, the market is well established at 2.95c. Large jobbers are able to buy galvanized sheets at 3.60c., Pittsburgh, while the price to manufacturing consumers is $2 higher. On the other finishes of sheets no deviations from the quoted maximum prices are reported.

Tin Plate.—A slight improvement in the demand for tin plate is reported from some quarters. Operations have been curtailed by a few mills, while others are operating at capacity at the expense of backlogs and advance tonnage. The leading interest is running its mills this week at about 87 per cent of rated capacity, against 84 per cent last week, while independents are at a somewhat higher rate. Shipments are declining, but spot tonnages placed during the last week have bettered the situation. August requirements of the container manufacturers, which were specified prior to June 15, were generally up to expectations.

Strip Steel.—Specifications are holding up surprisingly well, and one company reports heavier tonnage releases thus far in June than were received during the corresponding period in May. Delivery promises on hot-rolled strip in the wider sizes are still rather extended, running as long as six weeks in some cases, though the narrower widths are obtainable in two to three weeks. With reduced backlogs on some sizes, operations are still being maintained at practical capacity, indicating that current demand is proving satisfactory. Cold-rolled strip shipments are obtainable in three to four weeks. Tonnage releases are heavy for this time of the year. Large buyers have generally closed their third quarter contracts, and the tonnages involved indicate a heavy summer demand for strip steel. Price irregularities are seldom encountered, the quotations generally adhered to being 2.75c. to 2.85c., Pittsburgh or Cleveland, on cold-rolled strip and 1.90c. and 2c., Pittsburgh, on the hot-rolled material.

Cold-Finished Steel Bars.—Slight declines in automobile production are reflected in lighter specifications for cold-finished bars, but other consuming industries are taking steel in large quantities, and shipments are holding up well. Reports of reduced requirements from the agricultural implement industry are not yet confirmed by mills in this territory and automotive parts and accessory makers are active. Third quarter contracts are being closed at the full quoted price, 2.30c., Pittsburgh.

Coke and Coal.—Shipments of foundry coke against contracts have fallen off in the last week, and, although curtailed foundry operations may be due partly to hot weather, demand has undoubtedly eased off since the first of the month. A few third quarter contracts have been signed, but consumers seem reluctant to make commitments far in advance. Prices on the common grades of coke are weak, but the premium brands are firm at $4.85, ovens. The market for furnace coke is dull, and prices are unchanged at $2.75 to $2.85, Connellsville. Coal companies in the Pennsylvania and West Virginia territory report a growing shortage of miners. Some operators hesitate to make sales on account of the uncertainty of deliveries. In view of this, the market has a slightly stronger tone.

Old Material.—Little mill buying has been reported in the last week, although a round tonnage of heavy melting steel was sold to one consuming point in the district, where the requirements are not rigid, at about $17.75. The market on good No. 1 heavy melting steel, however, is still quotable at $18 to $18.50 and, although dealers are offering scrap freely, railroad material or its equivalent might bring a higher figure. Shipments of heavy melting steel against contracts are being held up by at least one mill in the district, and the supply of this grade is considerably more plentiful than it was a week or two ago. Compressed sheet steel is also coming out freely, and recent sales at $18.25 represent the top of the market, a decline of 25c. from last week's range. Specialties are scarce and prices are strong at recent levels.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.45c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.00 to $18.50
No. 2 heavy melting steel	15.50 to 16.00
Heavy melting car sides	17.00 to 17.50
Scrap rails	17.25 to 17.75
Compressed sheet steel	17.75 to 18.25
Bundled sheets, sides and ends	16.25 to 16.75
Cast iron carwheels	16.00 to 16.50
Sheet bar crops, ordinary	18.50 to 19.00
Heavy breakable cast	12.50 to 13.00
No. 2 railroad wrought	18.00 to 18.50
Hvy. steel axle turnings	16.00 to 16.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	21.00 to 21.50
Railr. coil and leaf springs	21.00 to 21.50
Rolled steel wheels	21.00 to 21.50
Low phos. billet and bloom ends	22.00 to 22.50
Low phos., mill plates	22.00 to 22.50
Low phos., light grades	20.00 to 20.50
Low phos., sheet bar crops	20.00 to 21.00
Heavy steel axle turnings	16.00 to 16.50
Electric Furnace Grades:	
Low phos., punchings	19.50 to 20.50
Hvy. steel axle turnings	16.00 to 16.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Better Employment Volume in Ohio

Industrial employment in Ohio has increased steadily since last December. In May it was 2 per cent greater than in April and 10 per cent greater than in May, 1928, according to the Bureau of Business Research of Ohio State University. During the first five months the number of wage-earners was 10 per cent greater than in the like months last year, according to reports from 589 manufacturers.

In the iron and steel group there was no change in the volume of employment in May as compared with April, but there was an increase of 9 per cent from May, 1928. Foundries and drop-forging companies had employment 12 per cent higher than in May, 1928, and sheet metal manufacturers, 27 per cent higher. Machine tool builders showed an increase in May of 4 per cent over April and of 32 per cent over May, 1928.

A list for 49 books on foundry practice in the English language has been prepared by the department of engineering shops, colleges of engineering and architecture, University of Michigan, Ann Arbor, Mich. A copy may be secured by addressing H. L. Campbell, associate professor of metallurgical engineering.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	$35.00 to $36.00
Rerolling, 4 in. and under 10 in., Youngstown	35.00 to 36.00
Rerolling, 4 in. and under 10 in., Cleveland	35.00 to 36.00
Rerolling, 4 in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00 to $36.00
Youngstown	35.00 to 36.00
Cleveland	35.00 to 36.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00 to $36.00
Youngstown	35.00 to 36.00
Cleveland	35.00 to 36.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic Swedish, average 65% iron	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c. to 35.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c. to 35.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.00 to $15.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75 to $2.85
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		Per Gross Ton Furnace	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$31.00	12%	$35.00
11%	33.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$24.00	10%	$29.00
7%	25.00	11%	31.00
8%	26.00	12%	33.00
9%	27.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to $18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

SIDE GUIDE & GRIPPER

Chicago

Summer Consumption of Steel Will Be Well Above Normal —Southern Pacific Distributes Rail Tonnage

CHICAGO, June 18.—The Southern Pacific has ordered 33,864 tons of standard-section rails, 9000 tons having been taken by the Colorado Fuel & Iron Co., and about 12,400 tons each by the Tennessee company and the Bethlehem Steel Co. The Hocking Valley tonnage is still open. Preliminary inquiries on the part of several Western railroads lead to the impression in the trade that a resumption of secondary rail purchases is not far in the future.

The finished steel market is steady under the influence of uniform demand from a wide classification of consumers. Forward buying is gaining headway and is now making itself felt in such a way that sales are the best in four weeks. Notwithstanding that the demand for steel for automobile building purposes is off about 15 per cent, specifications this week are the best since the turn of the month.

Confidence in the trend of business in the summer months is growing, and, in view of the size of mill order books and the freedom with which users are taking steel, little doubt remains among sellers that shipments of steel in the next two or three months will be well above normal summer consumption.

Automobile building in the light car field appears not to have changed in recent weeks. Builders of the higher-priced cars are in the midst of changing models, and some of these companies plan to have shipments of steel resumed about July 1.

In other industries there are few signs of recession except that which involves the inability of labor to produce in hot weather.

The effect of grain prices on the farm implement manufacturing trade is not well defined. If a recession is at hand, it is slow in making itself felt in releases of steel. Output of ingots is at capacity, and allotment of steel is as important today as it was last month. The semi-finished steel market is as tight as it was 60 days ago. The stress for steel in recent weeks has prevented buyers building stocks, and, as a result, the tendency in new buying is to cover for longer periods of time.

Ferroalloys.—Ferromanganese is moving in scattered carloads at $105 a ton, seaboard. Shipments against contracts are heavy. Several carloads of spiegeleisen have been taken at $34 a ton, Hazard, Pa.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $40.76.

Pig Iron.—Contrary to expectations, shipments of Northern foundry iron in the past week were a shade larger than in the previous week, which may in part be attributed to low stocks in the hands of consumers, growing confidence in the demand for castings in the early summer months and the fact that less boat iron has reached Chicago in the first half of June than in the last two weeks of May. A cargo of boat iron is due in Chicago this week. This will make the seventh cargo to have been distributed in this district since navigation opened. Forward buying is still in evidence, but the bulk of local melters' needs is already under cover. The Southern iron market is weak. Local sellers are offering this commodity at $14.50 to $15, Birmingham.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$20.51 to 21.01
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	30.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Structural Material.—This market is moderately active, and competition is unusually keen. Fabricated steel prices are holding well locally, but in outlying territory the condition of shop books is spotty and prices for fabricated material show wide variations, with a tendency to seek lower levels. Reports are persistent that ground will be broken next month for the Crane Tower, Chicago, which will call for close to 75,000 tons of steel. Bids will be taken this week on the steel for reconditioning the Chicago Fine Arts Building. A power plant at Michigan City, Ind., requiring 5000 tons, is said to have been taken by an unnamed bidder, and a bridge at Peoria, Ill., requiring 3000 tons, has been awarded to a general contractor.

Mill prices on plain material, per lb.: 2.05c. to 2.15c. base, Chicago.

Rails and Track Supplies.—It is reported here that the 34,000 tons of rails asked for by the Southern Pacific and the 2900 tons, on which the Hocking Valley has taken bids, are still open. Buying of standard-section rails is quiet, but it is not improbable that this situation will soon change, as several railroads have signified their intention to enter the market for secondary tonnages. New orders for track supplies total 5000 tons, including 1000 tons of iron tie plates. Rail output stands at 85 per cent of capacity. This rolling schedule will be cut down about July 1. Sales of light rails are larger than in recent weeks.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—This market has again gone back to its listlessness of late May. A few scattered jobs are open in Michigan, and there is promise of more work in that State. Locally and in States to the South and West, there are a few projects on which bids are being asked. Contractors in Chicago are particularly hard pressed for work. A bright spot appears, however, in the fact that engineers' offices are busier and there are some in the trade who see a quickening in the market late in the summer or in the early fall months. A few carload orders have come from railroads that are building water treating plants, and there have been several spot orders from public utilities. It is reported that Dearborn, Mich., has placed 400 tons of pipe. The Columbia Contracting Co. is successful bidder at Plymouth, Ind. Among projects up for bids are 100 tons for Monroe, Mich.; 5000 ft. each of 6 and 8-in. pipe for Birmingham, Mich., and 4000 ft. of 60-in. pipe for a Milwaukee sewer.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Sheets.—Chicago producers continue to operate at 85 per cent on the average, but hot weather, if it continues through the week, may force curtailment. New buying is in good volume. Possibly it is a shade more active than a week ago. Specifications are fully equal to shipments in blue annealed and black sheets, while in the galvanized product demand is running ahead of output and deliveries are lengthening. Average promises are six to eight weeks for blue annealed and black sheets and four to six weeks for galvanized sheets. Competition from other producing centers is unusually keen in the Southwest. Jobbers report an active business in sheets, and this is substantiated by their mill orders. Demand for sheets by the manufacturing trade as a whole is well sustained.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.10c.; No. 24 galv., 3.85c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Wire Products.—This market has changed little in the last week. For-

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.10c. to 2.40c.
Reinforc'g bars, rail steel	1.90c. to 2.05c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅝ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

ward contracting is progressing at a satisfactory rate and spot business is in good volume. Demand from the automobile industry is lighter. Builders of harvesting machinery are taking smaller shipments, but other allied lines, such as hay cutters and tractors, are using wire and wire products at an undiminished rate. Distribution by the jobbing and retail trade shows some improvement in parts of the country where recent rains have not made roads impassable. In some sections of the South flood waters are interfering with trade.

Bars.—Demand for mild steel bars is steady. Specifications still equal shipments. New buying is gaining headway at 2.05c. to 2.15c. a lb., Chicago. Local forgers, having a diversified field from which to draw orders, continue to produce at near capacity in spite of the decline in the rate of automobile building. Shipments of bars to farm implement manufacturers have not changed in recent weeks, though May in that industry established a record in shipments of machinery. Shipments of iron bars are steady and in good volume. Mills have sizable backlogs, and new purchases are not exceeded greatly by shipments. Farm implement manufacturers continue to take alloy steel bars at the schedules arranged early in May. Hold up orders issued by automobile builders will cause local producers little inconvenience, for the reason that they will produce the steel as originally planned, with the understanding that steel not taken in July may be shipped in August. Specifications for rail steel bars are larger than shipments. New buying is slow, and mill backlogs are dwindling. The bed industry is taking normal quantities for this time of the year. Prices are firm at 1.95c., Chicago Heights.

Plates.—The Chicago plate market remains active. One order for small tanks will take 600 tons. Fresh inquiry totals 6200 tons, of which 5000 tons is for a job on the Pacific Coast and 1200 tons is for a tank project at Houston, Tex. Boiler makers in this district are actively engaged and their order books are of good size. Specifications for steel from railroad car shops are large, but the tonnage that still remains to be specified against car orders is dwindling. New releases are fully equal to shipments and deliveries are not improved.

Reinforcing Bars.—Demand for this commodity lags when compared with tonnages ordered in the first two weeks of June, last year. The Great Lakes Construction Co. has placed 1200 tons for the Burnham Avenue bridge, Chicago. Other than this, current lettings are confined to small lots averaging well below 50 tons each. Work of that kind, however, is above normal and on the whole quite satisfactory to sellers, who find prices more stable on small lots than on large orders. The school program in Chicago is marking time because of lack of funds. Illinois State highway work remains sluggish, but in Indiana tonnages for like purpose are being ordered. Awards are running ahead of the average last month.

Tin Plate.—Specifications coming to Chicago district mills are in large volume and afford operations at near capacity. Larger releases in the last week have made it necessary for one producer to add extra turns. New buying is dull.

Bolts, Nuts and Rivets.—Prices are firm. Third quarter contracting is in full swing. Farm implement manufacturers are taking these commodities in undiminished volume, and liberal shipments are being made to the railroads. The industry as a whole is engaged between 75 and 80 per cent of capacity.

Hot-Rolled Strips.—Operations remain at capacity, with mill schedules well arranged through July. Forward buying is slowly gaining headway.

Cold-Rolled Strips.—Specifications are somewhat lighter, and for the first time in many weeks do not equal shipments. Deliveries to farm implement manufacturers are at an undiminished rate. Forward contracting has gone ahead rapidly, and the bulk of third quarter commitments has been made.

Coke. — Shipments of by-product foundry coke are a trifle heavier this week, reflecting a high rate of melt in this district. Prices are strong at $8 a ton, f.o.b. local ovens.

Old Material.—The Chicago scrap market is giving every indication of having reached the dullness which is expected by the trade in the summer. With the fear that suspensions may overtake them, dealers are eagerly seeking tonnages to apply against old contracts. New buying is at the lowest point in several months. Prices for cast iron borings are weaker, with one consumer naming $10.25 as his best offer. Dealers find ample supplies at $10 a gross ton, delivered. Several contracts for this grade have been filled. Demand for busheling is stagnant, both as to consumers' interest and trading among brokers. Large users seem willing to take their obligations in full, but several small buyers, finding business less certain, have suspended shipments due them. Supplies of railroad malleable are more liberal as larger shipments reach Chicago from outlying points. On the brighter side of the market is a report that local brokers are offering as high as $15.50 a gross ton, delivered, for country heavy melting steel. Offers, it is said, are being made to reputable sellers, on whom reliance can be placed that grading will be of a character that will be accepted by local mills. Some sellers still complain about the scarcity of certain specialties. Stiffening in prices on dealer trades in a few specialties is looked on by some as the first indication of a turn for the better. A strong point in favor of the market as a whole is that consumers generally have small stocks on hand and any change in the melt of scrap will be quickly reflected. The Burlington will open bids June 26 on a sizable list.

Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$15.00 to $15.50
Shoveling steel	15.00 to 15.50
Frogs, switches and guards, cut apart, and misc. rails	16.50 to 17.00
Hydraul. compressed sheets	13.00 to 13.50
Drop forge flashings	10.50 to 11.00
No. 1 busheling	13.25 to 13.75
Forg'd cast and r'l'd steel carwheels	18.25 to 18.75
Railroad tires, charg. box size	18.50 to 19.00
Railroad leaf springs cut apart	18.50 to 19.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.75 to 17.25
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.50 to 15.00
Low phos. punchings	16.75 to 17.25
Low phos. plates, 12 in. and under	16.50 to 17.00
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	9.75 to 10.25
Short shoveling turnings	9.75 to 10.25
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	17.50 to 18.00
Cupola Grades:	
Steel rails less than 3 ft.	18.00 to 18.50
Steel rails less than 2 ft.	18.50 to 19.00
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.50 to 15.00
Malleable Grades:	
Railroad	17.75 to 18.25
Agricultural	15.75 to 16.25
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	26.00 to 26.50
Steel car axles	16.50 to 17.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.25 to 13.75
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.75 to 14.25
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	10.50 to 11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Crucible Steel Co. Increases Earnings

The Crucible Steel Co. of America reports net earnings for the first six months of 1929 at $4,202,500. The result for the first five months is actual and that for the present month has been estimated. Earnings for the second quarter are equivalent to $3.61 per share of common stock, or at an annual rate of $14.44.

H. S. Wilkinson, chairman of the board, in a statement to stockholders, says that a stock dividend will be declared before the end of the year. The present cash dividend of 1¼ per cent quarterly on the common stock is continued.

Mr. Wilkinson's statement says: "The company has enjoyed a record volume of business in the high-grade tool, alloy and special steels that has greatly increased its earnings during the past six months, and the condition of your company is the best it has been since its organization."

New York

Reduced Rail and Water Rates on Southern Pig Iron Go Into Effect—Steel Volume Still Large

NEW YORK, June 18.—Reductions in freight rates on Alabama iron to various Southern ports for transshipment by vessel to Northern points went into effect June 13. Rates for the water haul are to become effective the end of this month. As a result of the lowering of transportation costs on Southern pig iron, representatives of Alabama furnaces are more actively soliciting business in this and adjoining districts. So far as can be learned, no large sales have been made as yet. The handling of iron by ocean-going barge or schooner has its disadvantages. A sufficient number of cars must be assembled at one time at the Southern port to make up a cargo. The amount of iron in a schooner or barge is too great except for the largest consumers. If the cargo must be divided and shipped to a number of foundries, storage and handling space must be obtained at the Northern port. Insurance, unloading charges, storage fees and rates on the final rail haul must all be added to the combination rail and water rate before a fair comparison with an all-rail rate can be made. Prospects of more favorable barge rates from Buffalo have improved as a result of a sharp decline in grain traffic on the State barge canal. The emergency reduction in all-rail rates on grain has diverted so much business to the railroads that one important barge line has been forced to suspend the operation of several of its canal fleets. Pig iron sales in this district during the week totaled only about 7500 tons, but inquiry has improved. The General Electric Co. is in the market for 5000 tons for various plants, and the Eastern Malleable Iron Co., Naugatuck, Conn., wants 1100 tons of malleable. The Malleable Iron Fittings Co., Branford, Conn., has closed against an inquiry for 1200 tons of malleable. The New York Central Railroad is asking for prices on 250 tons of foundry and charcoal iron for delivery at Frankfort, N. Y., or Elkhart, Ind. The New Jersey Zinc Co. wants 150 tons of foundry for its Palmerton, Pa., plant. The price situation is unchanged, foundry iron commanding $17.50 to $18, base Buffalo, or the equivalent.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.89 to 23.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Reinforcing Bars.—A large amount of work is pending, but it is slow in being placed, possibly because of high interest rates. An automobile storage building for the New York Central in this city, on which general contract bids were taken today, calls for 1400 tons of bars. Igoe Brothers have taken an order for 700 tons for sewer work in Brooklyn.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Finished Steel.—Except in structural steel, there is not much new business in the making, but the volume of specifications against contracts, though slightly less than during the last half of May, is still large. Deliveries on some products are improving, but the mills still have sufficient backlogs to assure a high rate of operations through July. Third quarter contracts have been quite generally renewed, and in many instances these call for the same tonnages that were used in the second quarter. During this three-months' period some buyers overspecified their contracts. Structural awards of the week include 3900 tons for an addition to the International Telephone & Telegraph Co. Building at Broad and Beaver Streets. 4700 tons for the Lefcourt-Plaza Building in Newark and 2000 tons for a plant for the Procter & Gamble Co. at Baltimore. For the Goldman-Sachs Building on Pine Street. 2000 tons is in the market. The Boston & Maine Railroad has ordered 1000 box cars and the New York, New Haven & Hartford has ordered 121 passenger train cars.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Warehouse Business.—Demand for material from stock has been lighter in the past week, but the month's business is expected to compare favorably with that of May. Although jobbers in the Philadelphia district have adopted the new mill bases of Nos. 10 and 13 gage in quoting on blue annealed sheets, warehouses in this district are still using No. 10 gage as the only base. Demand for structural material is declining slightly. Reinforcing bars are inactive.

Cast Iron Pipe.—There is a fair volume of private purchasing, but tonnages are small. Prices are still irregular and not particularly strong. At the recent opening of bids by Yonkers, N. Y., on 215 tons of 6-in. Class C pipe, quotations a net ton were as follows: R. D. Wood & Co., $35.95; United States Pipe & Foundry Co., $36.40; Warren Foundry & Pipe Co., $38.80; Donaldson Iron Co., $40.70. The freight rate from Eastern foundries to Yonkers, N. Y., was about $4.60 per ton. The Marine Corps quartermaster at Parris Island, S. C., will open bids June 20 on 75 tons of 10-in. centrifugal cast iron pipe. Washington opens bids June 21 on 3015 tons of 8 to 20-in. Class B pipe and 186 tons of fittings. The Washington suburban sanitary district at Hyattsville, Md., has opened bids on 1675 tons of 6 to 12-in. water pipe.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.60 to $35.60; 4-in. and 5-in., $37.60 to $38.60; 3-in., $44.60 to $45.60. Class A and gas pipe, $3 extra.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, base,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Coke.—Quotations on standard furnace coke range from $2.75 to $2.85 a net ton, Connellsville, the higher price applying usually on carload lots. Special brands of beehive coke are $4.85 per net ton, ovens, or $8.56, delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. By-product coke is quoted at $9 to $9.40 per net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—No. 1 heavy melting steel is quiet. Brokers are paying $15.50 to $15.75 a ton, delivered Claymont, Del., and $16 per ton, delivered to Bethlehem, Steelton or Coatesville, Pa. For No. 2 heavy melting steel $12 a ton is being paid for delivery to a consumer at Phoenixville, Pa. Foundry grade stove plate is off slightly, a Bridgeport, Conn., consumer offering only $11 a ton, delivered.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.00 to $13.35
Heavy melting steel (yard)	8.00 to 9.25
No. 1 hvy. breakable cast.	11.25 to 12.00
Stove plate (steel works).	7.75 to 8.25
Locomotive grate bars....	8.25 to 8.75
Machine shop turnings....	7.25 to 7.50
Short shoveling turnings..	7.25 to 7.50
Cast borings (blast furn. or steel works).....	7.00 to 7.25
Mixed borings and turnings	6.75 to 7.25
Steel car axles.....	19.25 to 19.75
Iron car axles.....	24.00 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	11.25
Forge fire	9.50 to 10.00
No. 1 railroad wrought....	12.00 to 12.50
No. 1 yard wrought, long..	11.00 to 11.50
Rails for rolling.....	13.00 to 13.50
Cast iron carwheels.....	12.00 to 12.25
Stove plate (foundry)....	8.25 to 8.50
Malleable cast (railroad).	14.00 to 14.50
Cast borings (chemical)..	10.00 to 10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Foundry Equipment Index Up

The index of gross orders for members of the Foundry Equipment Manufacturers Association was 177.7 in May, compared with 172.6 in the previous month. The May index of shipments was 217, compared with 220.3 in April. Unfilled orders at the end of May stood at 323.8, against 363.4 one month previous.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....2.25c. to	2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ⅛ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24).....3.70c. to	3.90c.
Galvanized sheets (No. 24).4.60c. to	4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.95
No. 9 gal. wire, per 100 lb.....	3.40
Com. wire nails, base per keg.....	2.95

*Net base, including boxing and cutting to length.

Cleveland

Tapering in Steel Specifications Has Not Yet Affected Mill Operations—Semi-Finished Steel Reduced

CLEVELAND, June 18.—Specifications for steel bars, billets and structural shapes show a considerable slowing down, indicating that the summer lull is at hand. Mills, however, have such good backlogs that there are no reports of curtailment of mill operations.

There has been some further curtailment by the automotive industry, which has extended to one or two makers of low-priced cars. However, the production of motor cars is still larger than usual at this time of the year. The output for the first five months of the year showed a 49 per cent gain over the corresponding period last year. Michigan automobile companies are now making close to 18,000 cars a day. Of this number, the Ford company is credited with 7500 and Chevrolet with 6000. Some further reductions are expected in July, although a few of the motor car manufacturers plan to increase their output some time next month when they start on new models.

The delivery situation is easier on steel bars, sheets and hot and cold-rolled strip steel. However, there is still some pressure for deliveries. Demand for plates from small-lot buyers has improved recently, as boiler and tank shops are busier than earlier in the year.

Two large awards have been made to Cleveland manufacturers of handling equipment by the Hocking Land & Development Co. for equipping docks at the Presque Isle terminal of the Hocking Valley Railroad at Toledo. The Wellman-Seaver-Morgan Co. has been awarded a contract for three 17-ton capacity ore unloaders, requiring 2750 tons of structural steel and steel castings, and the Industrial Brownhoist Corporation has been given a contract for two 120-ton car dumpers that will require 2500 tons of steel.

Few third quarter contracts for steel bars, plates and structural shapes have been taken since the reestablishment of the second quarter prices, and there has not been much contracting for other steel products.

Steel bars are quoted at 1.95c. to 2c., Cleveland, and plates and structural material at 1.95c., Pittsburgh.

Semi-Finished Steel.—At least one producer has named $35 for sheet bars, billets and slabs for the third quarter. This is the price that prevailed on second quarter contracts for sheet bars and $1 a ton higher than the second quarter price on billets and slabs. Mills had recently been asking $36 for the three products, but the proposed advance on sheet bars met with sharp resistance from buyers. A local mill has named $35, Cleveland, Youngstown and Pittsburgh, on billets and slabs for the third quarter and reports one sale of 18,000 tons at that price.

Pig Iron.—The market was quite active the past week, during which Cleveland interests sold over 29,000 tons in foundry and malleable grades. This was a moderate gain over the previous week's business. While most of the tonnage was for the third quarter, there were a large number of small lot sales for early shipment. Some of the smaller foundries are following a policy of hand-to-mouth buying. No inquiry has come out for the entire last half, although some producers would be willing to go through the remainder of the year at present prices. Sales during the week included 1000 tons to a Cleveland foundry and 600 tons to a Tiffin, Ohio, consumer. The General Electric Co. is inquiring for 1200 tons for its Erie works. The Westinghouse Electric & Mfg. Co., which inquired for iron for its Cleveland plant for the third quarter, has not yet made its purchase. Prices are well stabilized at recent quotations. Foundry and malleable iron are quoted at $19, furnace, for local delivery and at $18.50 for outside shipment, although furnaces are able to get a little higher price for shipment to some outside points. In Michigan, foundry and malleable iron are quoted at $20. June shipments will show some decrease, as compared with May, there having been a decline in shipping orders from some of the automobile foundries. Jobbing foundries in this territory have not decreased operations and have not cut down on shipping orders.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25...$21.00 to	21.50
Malleable	19.50
Ohio silvery, 8 per cent...	29.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley.. 26.50 to	27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Sheets.—Specifications are still fair, although in considerably less volume than recently, owing to the slowing down in the automotive industry. Deliveries show quite an improvement. Steel barrel manufacturers have been allowed a concession to 2.85c. on black sheets for the third quarter, the price that has been given to large buyers in the automotive field. Some current business is going at the same figure. Blue annealed sheets are firm at the new bases, but on galvanized 3.60c. is still common. Not much contracting has been done for the third quarter. Steel barrel production is still sharply reduced, and there has been some suspension of shipments of sheets to that industry.

Cold-Finished Steel Bars.—Most consumers have placed contracts for the third quarter at the reestablished 2.35c., Cleveland, price. Specifications

for screw stock have declined slightly, and screw machine plants look for a further slowing down at the expiration of their outstanding contracts July 1.

Wire Products.—The wire market lacks firmness, some consumers being able to place contracts at 2.40c. and others are still getting shipments against old contracts at the same price. These contracts are affecting specifications of mills having contracts at the higher price. Demand for nails is not active.

Warehouse Business.—Jobbers expect to revise blue annealed sheet prices July 1, but may decide to adhere to a single base and revise the extras to cover the recent changes in mill prices. Blue annealed sheets and plates are in heavier demand than in some time, but business in other lines shows a decline.

Alloy Steel Bars.—The recent price advance on billets under 4 x 4 in. and slabs in certain sizes by placing them on the steel bar base has materially stimulated specifications against second quarter contracts for sizes covered by the advance, and users will evidently have enough material on order in these sizes at the old prices to carry them well into the third quarter. Most consumers have taken out third quarter contracts at the reaffirmed 2.65c. base.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts continue good, the slowing down in the demand that is expected in June being less than usual this year. There has been considerable contracting for the third quarter at the reaffirmed 70 per cent discount. Rivets are moving in fair volume.

Iron Ore.—Water shipments are being made at about the same rate as in May, when a record for the month was established. Shippers expect that the 1929 movement will exceed 60,000,000 tons. The last year that figure was reached was 1923, although shipments in 1926 fell little short of that amount.

Coke.—Shipments against contracts for Connellsville foundry coke are holding closely to the recent volume, but new business is rather light. By-product foundry coke continues in good demand. This is quoted at $8.25, Painesville.

Strip Steel.—While the demand is lighter than a few weeks ago owing to the slowing down of the automotive industry, specifications continue to come from that source in fair volume. Deliveries by most makers have improved, as their production is in excess of incoming orders. Some of the mills can deliver hot-rolled strip in three weeks and cold-rolled material in four weeks. There has been a moderate amount of contracting for the third quarter at the reestablished prices.

Old Material.—There is a moderate volume of activity in blast furnace scrap in this district, but steel making grades are virtually at a standstill, because, with mill shipments still restricted, dealers are not buying to fill old orders. Blast furnace scrap is moving at quoted prices, but there is not enough local demand for heavy melting steel to test prices. A West Virginia steel maker is reported to have purchased a moderate tonnage of No. 2 heavy melting steel at $16.50. Dealers are offering $15 for the same grade for shipments to an Ohio River steel plant. There is some demand for steel making scrap for the Youngstown district, where dealers are paying $17.50 for No. 1 heavy melting steel and $17 to $17.25 for compressed sheet steel.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$15.00 to $15.50
No. 2 heavy melting steel	14.50 to 15.00
Compressed sheet steel	14.50 to 15.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	9.25 to 9.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.00 to 13.50
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos. plate scrap	18.00 to 18.50
Blast Furnace Grades	
Cast iron borings	10.75 to 11.00
Mixed borings and short turnings	10.75 to 11.00
No. 2 busheling	10.75 to 11.00
Cupola Grades	
No. 1 cast	17.25 to 17.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.00
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅜-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more: 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more: 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Third Quarter Steel Contracts Made—Southern Pig Iron Competition Has Had Little Effect

PHILADELPHIA, June 18.—Operating rates of steel mills have eased off slightly, but are still well up to rated capacity in most cases. Some contracts for third quarter delivery have been made on plates, bars, sheets and wire, but consumers generally are apparently in no haste to cover their requirements. Blue annealed sheet prices are firm, but some shading on black and galvanized has developed.

Despite competitive prices quoted by sellers of Birmingham foundry and basic pig iron, consumers in this district have not as yet been heavy buyers.

Pig Iron.—Eastern Pennsylvania furnaces are maintaining $21 to $21.50 a ton, furnace, on foundry iron, despite offers of Birmingham iron in this territory at $21.02 a ton, delivered, and occasionally lower prices. Many consumers apparently do not consider the saving sufficient incentive to offset the change in the analysis of their iron and their usual schedule of specifying a carload at a time on contracts. Basic consumers have in some instances received trial shipments of Birmingham iron, but no substantial tonnages have been bought. A Claymont, Del., mill, reported last week to have placed part of 10,000 tons with Southern sellers, is understood to have bought the entire tonnage from eastern Pennsylvania furnaces. About 1500 tons of cylinder iron for the Baldwin Locomotive Works, however, is said to have gone to an Alabama furnace. The rail and water rate now effective from Birmingham to Philadelphia, via Norfolk, is about $5.14 per ton, alongside dock at Philadelphia. The former lowest rail and water rate from Birmingham, via Savannah, Ga., was $6.01 per ton, loaded on cars at Philadelphia, from the Merchants & Miners Line. This line has now applied for a reduction in the rate via Savannah to $5.25 per ton. Third quarter contracting for foundry iron is light. The Baltimore & Ohio Railroad has closed on about 200 tons for third quarter and Levering Brothers, Hanover, Pa., are about to close on 300 tons of foundry iron.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.76 to $22.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to 22.76
East. Pa. No. 1X	22.76 to 23.26
Basic (del'd east. Pa.)	20.25 to 21.00
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Billets.—Consumers are not inclined to accept contracts on billets at the $2 advance for third quarter, which is $36 per ton, Pittsburgh, for rerolling and $41, Pittsburgh, for forging quality.

Bars.—A high rate of operation is being maintained by most mills, although there is generally less unfilled tonnage on their books than earlier in the quarter. Some contracts have been made for third quarter delivery, but buyers are slow to act as there is no price incentive. Quotations are unchanged at 1.95c. a lb., Pittsburgh, or 2.27c., delivered Philadelphia.

Reinforcing Bars.—Only small tonnages of bars are involved in current projects. Billet steel bar prices range from 1.90c. to 1.95c., Pittsburgh, quoted by eastern Pennsylvania makers, to 2c. and 2.05c., Pittsburgh, quoted by Pittsburgh mills. Delivered Philadelphia, billet steel bars are 2.22c. to 2.37c. a lb., with $5 extra for cutting to length. Rail steel bars are about 1.95c., Franklin, Pa., or Tonawanda, N. Y., or 2.27c., delivered Philadelphia, with no extra for cutting to length.

Shapes. — Fabricating shops are well filled with tonnage, but the number of new projects is small. Mill deliveries on shapes are fairly prompt, ranging from a week to two weeks, but most producers are maintaining good rates of operation. Prices continue irregular, ranging from 1.95c. to 2c. per lb., f.o.b. nearest mill to consumer, on good specifications and 2.05c., mill, on less desirable orders. Delivered Philadelphia, shapes are quoted at 2.01c. to 2.06c. and 2.11c. a lb.

Plates.—Contracts have been entered into for third quarter at the present price of 2.05c., Coatesville, or 2.15c., delivered Philadelphia, but most users are not inclined to hasten in covering their future requirements. Mills are maintaining a high rate of operation and still have some substantial tonnage in prospect from shipbuilders, when pending contracts are approved by the United States Shipping Board.

Sheets.—Radio manufacturers continue active buyers of small lots of deep drawing and electrical sheets. Automobile body builders are gradually decreasing their production schedules. Blue annealed sheet prices are steady at 2.25c. to 2.35c. a lb. for No. 13 gage, and light plates, blue annealed, range from 2.10c. to 2.20c., Pittsburgh, for No. 10 gage. Black and galvanized sheets have shown a slight tendency toward weakness, and small concessions have been granted from 2.95c., Pittsburgh, or 3.27c., delivered Philadelphia, for black and 3.70c., Pittsburgh, or 4.02c., Philadelphia, on galvanized.

Imports.—In the week ended June 15, arrivals at this port consisted of 2000 tons of pig iron from the United Kingdom, 649 tons of chrome ore from Portuguese Africa and 29 tons of ferrochrome from Switzerland.

Old Material.—Sellers of scrap are offering No. 1 heavy melting steel at $16 a ton, delivered, but consumers show only moderate interest in new contracts. A mill at Claymont, Del., has temporarily suspended shipments of No. 1 steel on its contracts, but a Coatesville, Pa., consumer is pressing for increased deliveries. No. 2 heavy melting steel prices cover a wide range on the basis of recent purchases. The latest buying price of a Phoenixville, Pa., mill was at $12.50 per ton, delivered, while a consumer at Conshohocken, Pa., paid $14 per ton. Other grades of scrap are quiet and prices are unchanged.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	$16.00
Scrap T rails	15.50
No. 2 heavy melting steel.	$12.50 to 14.00
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.00 to 15.00
Hydraulic compressed, old.	11.50 to 12.00
Machine shop turnings (for steel works)	11.50
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	15.50
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	11.50 to 12.00
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	20.00 to 21.00
Rolled steel wheels	20.00 to 21.00
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.50
Shafting	19.50 to 20.00
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.00 to 16.50
No. 1 cast	16.50 to 17.00
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Company Has Permanent Foundry Exhibit

A method of presentation of foundry equipment which is most unusual and interesting has recently been instituted by the American Foundry Equipment Co., Mishawaka, Ind. An entire corner of the company's plant now contains a complete installation of every type of equipment which the company produces. Each of the machines can be immediately put into operation either to present the advantages of each one or for the purpose of various kinds of testing or experimentation.

It was the original idea to make this a complete test laboratory, but it later developed that many customers were keenly interested in seeing all machines operating in one place so that a correct mental picture could be secured of the entire line. Because of this demand and the large number of visitors each week, the laboratory was turned into an exhibition room and made a permanent feature. There is on display sand cutters, sand metallic blast equipment, dust arresters, flasks and jackets, rod straighteners, core machines and other incidental equipment.

A pamphlet of 38 pages has been issued by the American Society for Steel Treating, Cleveland, which discusses factors which have contributed to the success of the society's chapters. Many of the different activities, which the numerous chapters indulge in during the year, and advice as to their management are included.

Merger of Lake Ore Fleets Proposed

A merger of 17 of the smaller independent steamship companies carrying ore, coal and other bulk freight on the Great Lakes has been proposed by Otis & Co., investment bankers, Cleveland, and is regarded as another link in a possible merger of some of the Central Western steel plants in which Cyrus S. Eaton of the Otis firm is a prominent factor. The combination of Lake vessel interests, as planned, would bring together a fleet of about 115 boats with 1,000,000 tonnage, or larger than the Pittsburgh Steamship Co. fleet of the United States Steel Corporation.

The proposed company would have a capitalization of $40,000,000 to $50,000,000. Present owners would be paid cash or given securities in the new company.

Fleets of the Interstate Steamship Co., operated by Pickands, Mather & Co., the Cleveland Cliffs Iron Co. and the M. A. Hanna Co. are not included in the merger plans as announced.

Temperature Regulators in New Plant

The Automatic Temperature Control Co., Inc., manufacturer of motor-operated controllers, regulating valves, relays, manual control stations, time cycle program-type contactors, electric heater controllers and dial-type position indicators and interrupters, formally opened a new plant and offices at 34 East Logan Street, Philadelphia, June 11. Invited guests visited and inspected the plant throughout the day.

The building, a two-story and basement structure, was designed and built as a school, but was not used as such, subsequently being acquired by the Automatic Temperature Control Co. and remodeled to meet its requirements. The basement and first floor are devoted to manufacturing and the second floor to executive and sales offices, drafting room and permanent exhibit room. The company's products, together with charts and photographs, are shown and, in addition, various types of contact instruments loaned by other manufacturers are exhibited.

The Automatic Temperature Control Co. was organized eight years ago by C. Wilhjelm and G. H. Johanson in the basement of Mr. Johanson's home. There have been three removals since that time. Mr. Wilhjelm is president, Mr. Johanson, secretary and treasurer, and J. D. Andrews, sales manager. In addition to manufacturing, the company renders engineering service in connection with equipment.

Iron ore produced in Missouri during 1928 totaled 109,899 tons, valued at $392,836, compared with 87,605 tons, valued at $296,255, in 1927, according to the report of the Missouri Bureau of Mines.

Pacific Coast

Southern Pacific Takes Bids on 33,864 Tons of Rails—Easing in Demand for Steel Products

SAN FRANCISCO, June 15 (*By Air Mail*).—A further easing off in demand for steel products is noted. Awards and inquiries, with few exceptions, were confined in the past week to unimportant tonnages. The feature was the opening of bids by the Southern Pacific Co., San Francisco, for 33,864 tons of 90, 100 and 130-lb. T rails. Other important developments included the award of 1300 tons of structural shapes for an office building in Los Angeles for the Southern California Telephone Co., the placing of 490 tons of plates for a penstock at Seattle and the letting of 1123 tons of cast iron pipe by Silver City, N. M.

Pig Iron.—Foundry operations are improving somewhat and a better demand for foundry iron is expected within the next 30 days. Most users still have fair-sized stocks and, as a result, movement has been confined mostly to spot lots. Quotations are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Small awards of reinforcing steel bars, ranging from 20 to 60 tons, continue to comprise the bulk of the going business. Among the larger lots booked this week were 293 tons for a bridge over the Feather River in Butte County, Cal., 200 tons for a stadium in Tucson, Ariz., and 100 tons for an apartment building in Los Angeles. Bids were opened this week on 2000 tons for the City-County Building addition, Seattle, and the general contract was placed with H. Pedersen. Out-of-stock prices in the San Francisco district are $2 a ton below those being quoted in Los Angeles, which are as follows: Carload lots, 2.40c., base; less than carload lots, 2.70c. Merchant bar material is quoted at 2.35c., c.i.f.

Plates.—The only important plate award of the week went to an unnamed interest and called for 490 tons for a penstock at Seattle, the general contract for which was placed with Rumsey & Jordan. Bids will be opened on June 25 for a siphon at Vale, Ore. The Southern Pacific Equipment Co. has withdrawn its inquiry for 1550 tons for car work at its Sacramento yards. Prices are unchanged at 2.35c., c.i.f. Coast ports.

Shapes.—Structural steel shape awards this week totaled less than 3000 tons. The Consolidated Steel Corporation booked 1300 tons for an office building in Los Angeles, and the Pacific Coast Engineering Co. secured 935 tons for pier shed No. 48, San Francisco. Bids were opened on 605 tons for an overhead crossing at Barstow, Cal., and on 600 tons for an exhibit building at Pomona for Los Angeles County. Pending business totals less than 7000 tons. No change in prices on plain structural material is noted, and 2.35c., c.i.f., continues firm.

Cast Iron Pipe.—Several fair-sized bookings were reported. Silver City, N. M., placed 1123 tons of 6 and 8-in. Class B pipe with C. Pleasant of Phoenix. The Griffith Co. took 117 tons of 4 to 10-in. Class C pipe for San Diego, Cal. Great Falls, Mont., awarded 226 tons of 6-in. Class B pipe to an unnamed interest, and Globe, Ariz., placed 217 tons of 4 to 12-in. Class B pipe with an unnamed company. Pending business is less than 1000 tons. The only new inquiry of the week calls for 200 tons of 4 to 10-in. Class C pipe for San Diego.

Steel Pipe.—The Standard Oil Co., San Francisco, has placed with unnamed interests 4697 tons of 10¾-in. seamless pipe and 652 tons of 10¾-in. O. D. lapweld pipe. The Pacific Gas & Electric Co., San Francisco, has an inquiry out for 2263 tons of 8⅝-in. O. D. pipe for installation at Gilroy, Salinas and Monterey, Cal. A better movement of standard steel pipe is reported.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Cincinnati

Sheet Bookings of Leading Independent Decline But Mill Operations Are Unaffected—Pig Iron Quiet

CINCINNATI, June 18.—Pig iron has been quiet the past week. The only important sale was 850 tons of Foundry and charcoal iron to the Louisville & Nashville Railroad. Aside from an inquiry for 1000 tons of Northern foundry from a Kokomo, Ind., melter, pending business is negligible. However, jobbing foundries in this district are operating at a high rate and are taking liberal shipments on current contracts. The price situation is unchanged, with Southern iron ranging from $15 to $15.50, Birmingham, and with Northern iron firm at $18.50, furnace. The demand for Jackson County silvery iron is holding up fairly well, and stocks at furnaces are depleted largely on account of the fact that the Globe Iron Co. has been delayed in getting its new blast furnace in operation. The American Rolling Mill Co. will shortly blow out one of its Ashland, Ky., furnaces for repairs and improvements.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	18.69 to 19.19
Ala. fdy., sil. 2.25 to 2.75	19.19
Tenn. fdy., sil. 1.75 to 2.25	19.19
S'th'n Ohio silvery, 8 per cent	27.89 to 28.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—The leading independent sheet steel producer states that bookings declined somewhat during the past week. Nevertheless, operations are continuing practically at 100 per cent of capacity on account of substantial backlogs which have accumulated in the last two months. However, mill schedules are becoming irregular, some having rollings available in two weeks and others not until as late as the first week of September. Bars, shapes and plates are moving in fair volume, but the slackened pace of building construction has had a depressing effect on the activities of district fabricators. Common wire nails are reported to be selling at $2.69 per keg, delivered Cincinnati.

Coke.—There has been some curtailment in the movement of by-product foundry coke, especially to automobile foundries. Specifications and orders, however, have been in larger volume than in the corresponding month of last year. Prices are steady, with by-product foundry quoted at $10.05, delivered Cincinnati.

Old Material.—Despite the rather light demand from consumers, the market has remained steady during the past week. This is accounted for by the fact that scrap of good quality is not plentiful and therefore dealers are paying liberally for tonnages to cover current contract obligations. Railroad lists closing the past week

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex. Squares	3.85c. 4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

brought good prices. Only in cast iron grades is there any noticeable sign of weakness.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.00 to $13.50
Scrap rails for melting	13.75 to 14.25
Loose sheet clippings	9.25 to 9.75
Bundled sheets	10.50 to 11.00
Cast iron borings	9.00 to 9.25
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	6.75 to 7.00
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.00 to 13.50
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.25 to 19.75
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Railroad malleable	15.25 to 15.75
Agricultural malleable	14.25 to 14.75

Canada

Vancouver, B. C., Taking Bids on Pipe

TORONTO, ONT., June 18.—Third quarter pig iron buying has not developed the strength local blast furnace representatives expected. Several melters have come forward with contracts calling for fairly large tonnages for delivery to the end of September, and inquiries are fairly numerous, but most buyers appear in no hurry to make known their requirements. Some improvement featured spot sales during the week. The daily melt continues at a high level, which is expected to be maintained throughout the next three months.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.10 to $24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10 to 24.60
Malleable	24.10 to 24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$25.50 to $26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50 to 26.00
Malleable	25.50 to 26.00
Basic	24.50 to 25.00
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Cast Iron Pipe.—Producers report a steady demand for pipe in many parts of Canada. Municipal governments have for some time past been making extensive purchases, and there is still a large prospective demand to be filled. To take care of expansion in the city water services, following the passage of the waterworks by-law, the Vancouver, B. C., waterworks committee has authorized the calling for tenders for the following iron and steel pipe: 2000 ft. of 4-in. heavy pressure cast iron pipe; 10,000 ft. of 6-in.; 10,000 ft. of 8-in.; 20,000 ft. of 6-in. medium pressure cast iron pipe; 10,000 ft. of 8-in. and 5000 ft. of 12-in. Tenders will also be called for on 10,000 tons of 18-in. steel pipe.

Structural Steels.—New business in this market has been falling off during the past week or two. Contract placing is confined chiefly to small tonnages, but there is still a prospective demand pending for approximately 25,000 tons for use throughout Ontario, and upward of 20,000 tons for the Montreal district. Bridge construction work in the various provinces will materially swell the tonnages mentioned. While programs have been announced for several new buildings, most of these will be of reinforced concrete.

Old Material.—A lull in buying has settled over the old material markets. New business is almost entirely in small tonnages. The demand for steel scrap is dull in the Ontario market, but fairly active in the Montreal district. Hydraulic compressed sheets have become stronger with a growing demand and dealers are offering $9 a gross ton, as against the former price of $8. Malleable scrap is weaker, with local dealers now offering $12.50 per net ton, against the former price of $14, and stove plate has softened slightly with a decline of 50c. per ton, dealers now offering $11.50, Toronto. Other prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Birmingham

Steel Backlogs Assure Steady Operation of Southern Mills Through July—Pig Iron Still Inactive

BIRMINGHAM, June 18.—Furnace interests have not yet opened their books for the third quarter, and at this late date the pig iron market is still without important inquiries for that period. Both melters and furnaces are apparently awaiting developments. Sales continue on a spot basis and carry the base prices of $15.50 in the Birmingham district and $15 for outside points. The Alabama City furnace of the Gulf States Steel Co. was changed from foundry to basic iron on June 15. Ten furnaces are now on foundry iron, six on basic and one on recarburizing, a total of 17.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$15.00 to $15.50
No. 1 fdy., 2.25 to 2.75 sil.	15.50 to 16.00
Basic	15.00 to 15.50

Finished Steel.—One of the larger companies reports demand below the weekly average of the past four months for the first time. Another reports no change. Tonnage released against contracts has been equal to the high rate of last month. Third quarter buying is under way at unchanged prices. Business now on books will insure steady operations through July. Structural steel fabricators report demand still above normal. New orders of the Virginia Bridge & Iron Co. include 1600 tons for the Murray Corporation at Memphis, Tenn., 245 tons for Candler Building, Atlanta, Ga., and 100 tons for a highway bridge in Louisiana. Awards of reinforcing bars are restricted to small tonnages. The total of active open-hearths remains at 21.

Cast Iron Pipe.—Award of contract is still pending on approximately 10,000 tons of pipe for the Philippines, on which the American Cast Iron Pipe Co. is low bidder. A new order received by this company calls for about 375 tons for Tchula, Miss. The National Cast Iron Pipe Co. has received an order for 800 tons for New Orleans. An order of the McWane Cast Iron Pipe Co. calls for about 340 tons for Vaiden, Miss. Two plants in the district are bidding on a New Orleans project which will require about 6650 tons of 36 to 42-in. pipe. Houston, Miss., opened bids June 18 for about 19,000 ft. of 6 to 8-in. pipe. Better shipments this month have moved some pipe from yards. It will require more business than is known to be in prospect to maintain present operations. The base prices have been $37 and $38 for several months.

Coke.—Shipments on contract have declined a little. Forward buying is moderately active as consumers continue to cover second half requirements. Spot coke is dull. Quotations remain at $5.

Old Material.—Aside from a few inquiries for steel grades, there is no interest in the market. Cast iron grades have been depressed for several weeks, a situation parallel to the pig iron market.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$12.50
Scrap steel rails	13.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	13.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	$10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	14.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

The Copperweld Steel Co., Glassport, Pa., has formed a southeastern district comprised of Georgia, Alabama, Tennessee, Florida, Mississippi and part of Louisiana, with P. A. Terrell in charge as district manager. The office of this district is located in the American Traders Bank Building, Birmingham.

St. Louis

Postponement of Freight Rate Reduction on Southern Pig Iron Expected to Stimulate Delayed Buying

ST. LOUIS, June 18.—Notice of the postponement to Jan. 13, 1930, of the proposed freight rate reduction of 73c. a ton on pig iron from the South to St. Louis came too late to affect pig iron buying during the last week, but it is expected to stimulate business considerably. Sales were light, the total of the St. Louis Gas & Coke Corporation having been only 1600 tons, 950 tons of which was for third quarter, the remainder for prompt shipment. Immediate shipment business mostly was in 100-ton lots, while 300 tons of malleable to an Iowa melter and 300 tons of foundry iron to an Iowa stove foundry were the largest third quarter lots. Shipments continue heavy; the average by the Granite City maker for the first 13 days in June was 1120 tons daily, compared with 1160 tons during May, which was the second largest month in the history of the company. The market is firm at unchanged prices.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	$19.42 to 19.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—Demand for plates, shapes and bars continues good, with deliveries considerably delayed by mills, a situation which has helped the warehouse trade. Railroad specifications for these items during the first half have been in excess of those in the same period last year. It is expected that inquiries for last half requirements will be issued within a week. A project of the St. Louis Southwestern Railway to extend a Texas line 45 miles, which would have required 6000 tons of 85-lb. rails, has been postponed. Building operations in St. Louis are still held up on account of the iron workers' strike.

Old Material.—The market for old material is quiet, but prices are firm. Most of the consumers in the district are well supplied with material, and generally will buy only at concessions, which dealers decline to make. Shipments from the country are light, as are railroad lists available to local dealers. No. 1 heavy melting steel and No. 2 railroad wrought are 25c. higher, while No. 1 railroad wrought is 50c. lower and railroad malleable and stove plate are down 25c. Railroad lists: Louisville & Nashville, 12,000 tons; Chesapeake & Ohio, 7039 tons; Chicago & Alton, 1130 tons; International Great Northern, 705 tons; Chicago, Milwaukee, St. Paul & Pacific, 175 carloads; Nickel Plate, 49 carloads; Frisco, 18 carloads; Pullman Co. (St Louis), 9 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.50 to $14.00
No. 2 heavy melting or shoveling steel	12.75 to 13.25
No. 1 locomotive tires	15.00 to 15.50
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	15.00 to 15.50
Railroad springs	17.00 to 17.50
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	15.50 to 16.00
Machine shop turnings	8.00 to 8.50
Heavy turnings	9.75 to 10.00
Steel car axles	19.00 to 19.50
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	16.50 to 17.00
Steel angle bars	14.25 to 14.75
Cast iron carwheels	14.25 to 14.75
No. 1 machinery cast	15.50 to 16.00
Railroad malleable	15.50 to 16.00
No. 1 railroad cast	15.00 to 15.50
Stove plate	11.50 to 12.00
Agricult. malleable	15.00 to 15.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Boston

Buffalo and Alabama Pig Iron Prices Weaker—Firmer Undertone and Some Advances in Scrap Market

BOSTON, June 17.—One Buffalo furnace is soliciting and has accepted business at reduced prices, and an Alabama stack also has reduced prices. Consequently the price structure of the pig iron market is weaker than it has been in several months. The cutting of prices is all the more significant in view of the absence of sizable prospective tonnages. No. 2X Buffalo iron, in car lots, has been sold to Providence, R. I., and Worcester, Mass., foundries at $17.50 a ton, furnace, and elsewhere at $18.25, furnace, while No. 1X has been sold and is available at $18.75 a ton, furnace, and less. Alabama iron is selling at $15 a ton, base furnace. One furnace east of Buffalo is meeting the lower Buffalo prices. A Rhode Island foundry is in the market for 1000 tons of No. 2X and 1000 tons of No. 1X iron for third quarter, and a combination of Connecticut melters seeks 1500 tons of malleable, of which 1000 will be consumed in New England. More than 5000 tons of iron was reported sold the past week.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$22.41 to	$23.41
*Buffalo, sil. 2.25 to 2.75	22.91 to	23.91
East. Penn., sil. 1.75 to 2.25		25.15
East. Penn., sil. 2.25 to 2.75		25.65
Va., sil. 1.75 to 2.25		25.21
Va., sil. 2.25 to 2.75		25.71
Ala., sil. 1.75 to 2.25	21.91 to	23.77
Ala., sil. 2.25 to 2.75	22.41 to	24.27

Freight rates: $4.91 all rail from Buffalo; $3.65 from eastern Pennsylvania; $5.21 all rail from Virginia; $6.91 to $8.77 from Alabama.

*All rail rate.

Coke.—A further slight easing off in specifications against by-product foundry coke contracts is reported by the three New England producers. The lessened demand is partly seasonal and partly due to some let-down in the melt of iron. By-product fuel is still $11 a ton, delivered within a $3.10 freight rate zone.

Shapes and Plates.—Fabricators report a decided tapering off in prospective business. About the only orders in sight at the moment are seven Bangor & Aroostook and one Boston & Maine railroad bridges and about 10 building jobs ranging from 100 to 200 tons. Virtually all fabricators are well booked up, however, and some of them

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.	*3.55c. to 5.55c.
Spares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

are getting better prices for small jobs. Mill representatives say contracting for third quarter standard shapes is satisfactory, with prices unchanged. The market for plates is holding up well, although current shipments by mills to New England points are somewhat under those of a month ago.

Warehouse Business. — Warehouses report a seasonal let-down in the movement of iron and steel out of stock. Because of the lessened demand there is more competition for business and shading of prices is more frequent.

Old Material.—The undertone of the old material market is distinctly firmer, but aside from advances of about 25c. a ton on heavy melting steel, long bundled skeleton and forge flashings, no upward movement of prices has occurred. In contrast with the general market, No. 1 machinery cast is down $1 a ton and difficult to sell even at the reduced price. Brokers report that all kinds of material are in limited supply and larger demand, with the Pittsburgh district the best market for scrap at the moment.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.25
Scrap T rails	11.50 to 12.00
Scrap girder rails	10.50 to 11.25
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	6.50 to 6.60
Cast iron borings (steel works and rolling mill)	6.25 to 6.50
Bundled skeleton, long	9.50 to 10.25
Forge flashings	9.50 to 10.25
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	8.75 to 9.00
Shafting	14.00 to 14.25
Steel car axles	17.00 to 17.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	10.50 to 10.75
Rails for rolling	12.00 to 12.50
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.50 to $14.75
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.50 to 12.00
Railroad malleable	18.50 to 19.00

airplanes has been increased to four units a week. Since Jan. 1 production has averaged three units a week. Unfilled orders will take the full output until some time in September.

The starting and lighting divisions of the Electric Auto Lite Co.'s plant are running at about 250 per cent of normal one-shift capacity.

The Willys-Overland Co. estimates production on the new 1½-ton Whippet commercial unit at about 50 a day.

No change in prices on old material has occurred during the past week, except for an advance of 50c. a ton on flashings. Current orders are sufficient to move scrap coming from producers.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$13.75 to $14.25
Borings and short turnings	9.00 to 9.50
Long turnings	7.00 to 7.50
No. 1 machinery cast	13.00 to 13.50
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	13.50 to 14.00
Stove plate	9.50 to 10.00
New No. 1 busheling	12.00 to 12.50
Old No. 1 busheling	11.00 to 11.50
Sheet clippings	8.50 to 9.00
Flashings	12.50 to 13.00

Detroit

Structural Activity Increasing — Automobile Output Tapering—Ford and Chevrolet Still Busy

DETROIT, June 18.—The most significant development in the market situation in this district is the recent acceleration in the structural field. The volume of steel business originating in remodeling operations and industrial additions, which up to this time has been only fair, is now taking on quite satisfactory proportions. New work, especially large projects, has been scarce, but is increasing quite rapidly.

The largest pending project is that of the Great Lakes Steel Co.'s plant at Ecorse, Mich. An addition to the airplane plant of the Ford Motor Co. at Dearborn, Mich., will take 725 tons of steel. A factory and service building for the Chevrolet Motor Co. at Flint, Mich., calls for 700 tons. An administration building for the Salvation Army in Detroit, the Saginaw Bell Telephone Exchange, and a church building for the Shrine of the Little Flower in Royal Oak are other pending jobs.

The May production figures of the automotive industry show about 6 per cent decline from those of the previous month. A further decline is forecast for June. However, the market for the lower-priced cars, notably Chevrolet and Ford, remains apparently unchanged, and car production in this class will probably maintain its present level. Production in the domestic plants of Ford Motor Co. is now at 7900 cars a day, while Chevrolet is turning out 6300 to 6500 units a day.

The accompanying table shows the situation.

Production of the tri-motored Ford

AUTOMOBILE PRODUCTION

Company	April	May	June Estimate
Auburn	2,565	3,032	3,007
Buick	11,119	12,000	20,400
Cadillac and LaSalle	4,206	4,200	4,200
Chandler	2,500	2,750	2,500
Chevrolet	157,137	160,895	150,000
Chrysler	59,785	54,595	50,000
Durant	11,404	10,094	9,000
Ford	190,388	200,903	197,500
Franklin	1,641	1,707	1,800
Gardner	700	700	700
Graham-Paige	11,550	11,677	11,500
Hudson-Essex	44,447	42,086	35,000
Hupp	6,111	5,329	4,800
Jordan	600	600	500
Lincoln	800	800	800
Marmon and Roosevelt	6,029	5,221	4,500
Moon	600	650	500
Nash	16,066	12,117	11,000
Oakland-Pontiac	36,384	28,444	32,000
Oldsmobile and Viking	15,752	16,000	14,800
Packard	4,750	4,561	4,600
Peerless	1,778	807	800
Pierce-Arrow	1,366	1,563	1,600
Reo	5,716	4,453	5,000
Stearns-Knight	300	300	300
Studebaker	14,000	14,000	13,000
Stutz	750	800	800
Willys-Overland	40,248	35,000	32,500

Youngstown

Open-Hearth Operations at Capacity

YOUNGSTOWN, June 18.—Despite a somewhat general falling off in specifications for steel products, open-hearth operations in this district are being continued at physical capacity, and occasional interruptions for repairs are more than offset by increased activity at Bessemer steel works. The supply of semi-finished steel is now adequate to meet the demands of finishing mills, although mill backlogs on sheets, strip and some of the heavier products are still more than sufficient to maintain operations at a high rate.

Demand for sheets is holding up well, and there is little improvement in deliveries, even on the common finishes. With business from consuming channels other than the automobile industry holding up well, producers will have little opportunity to reduce their backlogs very much before sheet mill operations will have to be curtailed somewhat on account of hot weather. In view of these circumstances, there will not be much opportunity to catch up on shipments until fall. Tin plate specifications have declined considerably since the first of the month, and operations and shipments are gradually easing off.

The pipe industry is in a better position than it was in the early spring, largely because of line pipe orders and improvement in oil field demand. Standard butt-weld pipe, however, has been seriously affected by the slump in building operations, and such business as has been placed has usually come as the result of considerable sales pressure.

Bars are still fairly active and the heavy demand for plates reported from other districts is reflected in this market.

Structural fabricating shops in the vicinity are not particularly well engaged. The McClintic-Marshall Co. will fabricate 2500 tons of shapes required for the new mill of the Republic Iron & Steel Co. to be used for making pipe by the electric welding process.

Non-integrated steel companies are closing third quarter contracts on sheet bars at $35, Youngstown, the price which prevailed on second quarter business. Although this is $1 less than the quoted price on spot business in the last two months, the higher price was not paid on any considerable tonnage. The same situation also applies on billets and slabs, but sellers have been reluctant to announce publicly the older prices on contract business because such an announcement might be interpreted as market weakness. However, business has been closed quietly at the prices which prevailed on second quarter business, and the $36 price is expected to be retained for spot tonnages.

Third quarter sheet contracts are being closed by the automobile industry, in many cases at advanced prices. Large buyers of black sheets in Michigan who ordinarily place their orders at $2 a ton under the minimum quotations are paying 2.85c., Pittsburgh, or better for black sheets, as against 2.75c. in the previous quarter, and on the general run of business mills are generally adhering to the 2.95c. quotation. On galvanized sheets the range is from 3.60c. to 3.70c., the lower quotation applying to the jobbing trade. Light plates are becoming well established at 2.20c., base, for No. 10 gage, and for blue annealed sheets, No. 13 gage, the price is 2.35c., base. Automobile body and metal furniture sheets are firm at 4.10c. and 4.20c. respectively. On other products, second quarter prices are applying generally.

Pig iron buying is confined largely to carload lots, but shipments against second quarter contracts are keeping up, and considerable third quarter buying is expected to develop soon. A few steel companies which buy pig iron have covered their needs for July and August, but the foundry trade has been reluctant to make known its future requirements. Steel foundries in the territory are very busy.

The scrap market reflects the strength reported from Pittsburgh. A large tonnage of heavy melting steel was closed recently at $18, delivered at a Youngstown district mill. Compressed sheets have brought a slightly lower figure, and specialties are stronger in the face of a limited supply.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb	3.75

Buffalo

Buying of Third Quarter Pig Iron Believed to Be at Hand —Steel Mills Maintain High Rate

BUFFALO, June 18.—With the General Electric Co. inquiring for 6000 tons of foundry iron for the third quarter, considerable impetus has been given to the pig iron market, and producers believe that a substantial buying movement for the next quarter is at hand. A 1000-ton lot of malleable for Eastern delivery is understood to have been placed, but apparently did not come to Buffalo. One furnace interest here announces that its going price for New England delivery is $18 for No. 2 foundry.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$18.50 to $19.50
No. 2X fdy., sil. 2.25 to 2.75	19.00 to 20.00
No. 1 fdy., sil. 2.75 to 3.25	20.00 to 21.00
Malleable, sil. up to 3.25	19.00 to 20.00
Basic	17.50 to 18.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—The demand for bars, shapes, plates and sheets continues very good. Production by local mills shows no falling off, ranging from 90 per cent to capacity. The Lackawanna plant of the Bethlehem Steel Co. has 21 to 22 open-hearths in operation, Donner Steel Co., eight or nine and Wickwire-Spencer Steel Co. three or four. The Seneca Iron & Steel Co. is running at about 90 per cent. The new City Hall job, contracts for which will be let this week, will require, in addition to a substantial tonnage of structural steel, about 600 tons of reinforcing bars. On June 20, the city of Buffalo will award 400 tons of reinforcing bars for a bridge over Michigan Avenue. A large volume of small reinforcing bar jobs has been closed.

Old Material. — With large consumption of No. 1 heavy melting steel in this district, the market for this commodity is strong at $17 to $17.25. One consumer here placed a small order for this material at $17 and expects to buy a further tonnage at about $17.25. Dealers are paying $17 to $17.25 against some old orders, but these are being rapidly cleaned up. In some instances dealers have paid $17.50 against these same orders. A few small sales of specialties have been made at the prices quoted, but other commodities are inactive except for a sale or two of No. 1 machinery cast at $16.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$17.00 to $17.25
No. 2 heavy melting steel	14.75 to 15.00
Scrap rails	16.50 to 17.00
Hydraul. comp. sheets	14.50 to 14.75
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.75 to 15.00
No. 1 busheling	15.50 to 16.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	7.50 to 7.75
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth	
Knuckles and couplers	19.00
Coil and leaf springs	19.00
Rolled steel wheels	19.00
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades	
Short shov. steel turnings	12.00 to 12.50
Blast Furnace Grades	
Short mixed borings and turnings	10.50 to 11.50
Cast iron borings	10.50 to 11.50
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	16.00 to 17.00
Stove plate	12.50 to 13.00
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.00 to 19.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Industrial	18.50 to 19.00
Railroad	18.50 to 19.00
Agricultural	18.50 to 19.00
Special Grades	
Chemical borings	12.50 to 13.50

Production and Shipment of Raw Materials and Finished Products in May

	May, 1929	April, 1929	May, 1928
Bituminous coal (a), net tons	40,172,000	36,888,000	36,624,000
Anthracite (a), net tons	6,329,000	6,441,000	8,124,000
Beehive coke (a), net tons	572,700	467,700	376,000
Locomotives, shipped (b)	99	61	41
Locomotives, unfilled orders (c)	444	495	220
Locomotives, shipped in 5 months	241	.....	263
Building construction activity (d)	211	179	185
Trackwork shipments, net tons (e)	16,333	16,815	14,141
Portland cement, bbl. produced (a) (f)	16,151	13,750	17,308
Portland cement, bbl. shipped (a) (f)	16,706	13,325	18,986
Portland cement, bbl. stock (a) (c) (f)	29,597	30,151	25,984
Mechanical stokers sold (b)	174	141	130
Mechanical stokers sold, hp. (b)	60,772	48,749	38,706
Electric industrial trucks and tractors shipped (b)	211	194	114
Shipped in 5 months	902	...	610

(a) United States Bureau of Mines.
(b) United States Department of Commerce.
(c) End of month.
(d) Associated General Contractors of America; index numbers based on 100 in 1913; May was higher than in any previous year.
(e) American Iron and Steel Institute.
(f) Thousands.

Non-Ferrous Metal Markets

Copper Quiet and Steady, Tin Active and Firm, Lead and Zinc Markets Fairly Active and Firmer

NEW YORK, June 18.

Copper.—Buying is not as active as it was last week, but sentiment continues optimistic. There has been a temporary setback in demand from foreign consumers, and no increase has yet developed in buying by domestic melters. The inactivity is considered only temporary because domestic consumers are not covered for August requirements and foreign consumers have not provided for a large part of their July and August needs. Some feel that the far forward buying, which developed a few months ago, is gradually giving place to another era of hand-to-mouth purchasing. Business on the books of consumers is still large, and a fair-sized buying movement is expected from both domestic and foreign users in the near future. The price situation is satisfactory. Quotations continue firm at 18c. for electrolytic copper, delivered in the Connecticut Valley, and at 18.30c. c.i.f., usual European ports, for export. Lake copper is moderately active at 18c. to 18.12½c. delivered. Most of the buying at present is for spot and June shipment, with some orders for July and August. In one or two cases, consumers are taking July metal for shipment this month.

Tin.—Buying is moderate, only 700 to 800 tons of Straits tin having been sold during the week ended June 15. Two rather interesting features characterize the market. One is the continued surplus of spot tin, with no relief in sight. The time of year is approaching when consumption falls off, particularly in tin plate. The situation is best illustrated by the contrast in prices of spot tin with those for future delivery. October metal is selling at around 45.37½c., with spot at about 44.37½c. The other feature is the announcement today of the formation of a large new combination in London known as the British-American Tin Corporation. The plan is to control the marketing, the production and other features of the tin industry and to stabilize the price at £265, which is equivalent to about 57.50c., New York. Not all producers of tin are in the combination, particularly the Singapore and the Dutch East Indies interests. Some well-posted sellers

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	June 18	June 17	June 15	June 14	June 13	June 12
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	44.62½	44.30	44.12½	43.62½	43.50	44.15
Zinc, East St. Louis	6.65	6.65	6.65	6.65	6.65	6.65
Zinc, New York	7.00	7.00	7.00	7.00	7.00	7.00
Lead, St. Louis	6.80	6.80	6.80	6.80	6.80	6.80
Lead, New York	7.00	7.00	7.00	7.00	7.00	7.00

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.00c.
Lead, wide	11.90c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.50c. to 11.00c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 46.50c. to 47.50c.
- Tin, bar ..... 48.50c. to 49.50c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.75c. to 8.25c.
- Lead, American pig ..... 7.75c. to 8.25c.
- Lead, bar ..... 9.75c. to 10.25c.
- Antimony, Asiatic ..... 10.75c. to 11.25c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ..... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy, ... 24.00c. to 25.00c.
- Babbitt metal, commercial grade, ... 30.00c. to 40.00c.
- Solder, ½ and ½ ..... 30.00c. to 31.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

- Tin, Straits pig ..... 48.00c.
- Tin, bar ..... 50.00c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 7.75c. to 8.00c.
- Lead, American pig ..... 7.75c. to 8.00c.
- Lead, bar ..... 10.00c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 19.00c.
- Babbitt metal, high grade ..... 52.00c.
- Solder, ½ and ½ ..... 30.25c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.25c.	16.00c.
Copper, hvy. and wire	14.00c.	15.625c.
Copper, light and bottoms	12.50c.	13.50c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	11.50c.	12.75c.
No. 1 yel. brass turnings	9.25c.	10.00c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.50c.	6.00c.
Lead, tea	4.50c.	5.50c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

in New York see a connection between the new company and the group which has been prominent for some time in the London market. With spot tin a drug on the market and with production at a high rate, it is believed here that it will be difficult to stabilize and control the market. Prices in London today were as follows: Spot standard at £201 5s.; future standard at £204 12s 6d., and spot Straits at £204 10s. The market in New York this week has been quiet until today when 400 to 500 tons of far futures was bought by consumers. Spot Straits tin is quoted at 44.62½c., New York.

Lead.—Prices are unchanged and firm at 6.80c., St. Louis, with demand continuing fairly large. Most of the buying is confined to prompt and June metal, with fair-sized inquiries for July. The undertone of the market is firm. The quotation of the leading interest continues unchanged at 7c., New York, as the contract price.

Zinc.—Sellers report fairly good sales for prompt, June and July. Most of the metal, which has been offered recently by one or two sellers at concessions, has disappeared, and the price situation is firmer. While there are one or two which still hold for 6.80c., East St. Louis, most of the sales are being made at 6.65c., East St. Louis, or 7c., New York. Again the ore price at the end of last week was $44, Joplin, and production, at 12,900 tons, showed another increase. This brings stocks still higher, to about 36,500 tons. Sales were about 10,900 tons, against 11,100 tons the previous week.

Antimony.—In a quiet market, Chinese metal is quoted at 9c., New York, duty paid, for spot and at 8.87½c. for futures.

Nickel. — Wholesale lots of ingot nickel are quoted at 35c. per lb., with shot nickel at 36c. and cathodes of electrolytic nickel at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, June 18. — Prices are steady in a market which is quiet both in sales and shipments against old commitments. Quotations on tin, after falling early in the week, have regained part of the loss.

Prices per lb., in carload lots: Lake copper, 18.12½c.; tin, 40.25c.; lead, 6.90c.; zinc, 6.75c.; in less-than-carload lots: antimony, 10c. On old metals we quote copper wire, crucible shapes and copper clips, 14.50c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.75c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

Boston & Maine Orders 1000 Box Cars

FURTHER railroad equipment buying is expected during the summer. An unexpected order of the past week was for 1000 cars, which the Boston & Maine placed with the Standard Steel Car Co. The New York, New Haven & Hartford has placed orders for 121 passenger train cars. The Rock Island has bought 3000 car bodies. The Canadian Pacific ordered 10 locomotives. Details follow:

Boston & Maine has ordered 1000 box cars from Standard Steel Car Co.

New York, New Haven & Hartford has placed orders for 121 passenger train cars as follows: 70 de luxe coaches, 24 de luxe smoking cars and six de luxe smoking-baggage cars with Osgood Bradley Car Co., subsidiary of Standard Steel Car Co.; 15 baggage-mail cars with Bethlehem Steel Co. and six dining cars with Pullman Car & Mfg. Corporation.

Chicago, Rock Island & Pacific has ordered 300 gondola car bodies from Bettendorf Corporation.

Pennsylvania has ordered 16 air dump cars from Koppel Industrial Car & Equipment Co. This road will build at its Altoona, Pa., shops 50 caboose cars, 25 horse express cars, four cafe cars and three dining cars.

New York, Chicago & St. Louis has ordered eight coaches, five baggage cars, three dining cars, two cafe coaches, two baggage-express cars and one baggage-mail car from Pullman Car & Mfg. Corporation.

Donner Steel Co. is inquiring for 12 steel gondola cars.

High Point, Thomasville & Denton has ordered 25 all-steel furniture box cars from Standard Steel Car Co.

Canadian Pacific has ordered 10 locomotives from Montreal Locomotive Works.

Foley Brothers, St. Paul, Minn., have ordered one 600-hp. oil-electric switching locomotive from Ingersoll-Rand and General Electric companies.

Malleable Castings Orders Off a Little in May

Reflecting a slight decline, orders for malleable castings in May totaled 77,262 tons, according to preliminary reports received from the principal manufacturers by the Department of Commerce, comparing with 80,679 tons in April.

May production was 79,805 tons, or 81.6 per cent of capacity, against 83,838 tons, or 87.6 per cent of capacity.

Shipments aggregated 78,925 tons, as compared with 81,060 tons.

Orders for the first five months of the current year were 400,098 tons, against 322,938 tons for the corresponding period of last year.

Production was 394,419 tons, or 82.3 per cent, against 327,784 tons, or 67.8 per cent, for the first five months of 1928.

The National Association of Flat Rolled Steel Manufacturers will hold its annual meeting at White Sulphur Springs, W. Va., June 24 to 26.

Reinforcing Steel

OF about 3800 tons of awards reported, 1200 tons was required for a bridge in Chicago. The only other award of size was 700 tons for sewer construction in Brooklyn. New projects totaling close to 4000 tons of reinforcing bars include 1400 tons for an automobile storage building in New York for the New York Central Railroad and 1000 tons in a power plant at Michigan City, Ind. Awards follow:

BOSTON, 350 tons, Atlantic & Pacific Tea Co. warehouse, to Barker Steel Co.

BROOKLYN, 700 tons, sewer work, Pievac Construction Co., general contractor, to Igoe Brothers.

NEW YORK, 200 tons, foundation work for West Side elevated highway, to Concrete Steel Co.

CHICAGO, 150 tons, extension to steam tunnel at University of Chicago, to Joseph T. Ryerson & Son.

CHICAGO, 1200 tons, Burnam Avenue bridge, to Calumet Steel Co.

CHICAGO, 275 tons, Horder store, to an unnamed bidder.

MILWAUKEE, 250 tons, telephone building, to American System of Reinforcing.

LOS ANGELES, 100 tons, apartment building on Bonita Terrace, to Pacific Coast Steel Co.

TUCSON, ARIZ., 200 tons, stadium, to unnamed bidder.

SACRAMENTO, CAL., 103 tons, paving in San Bernardino County, to unnamed bidder.

SACRAMENTO, 293 tons, bridge over Feather River in Butte County, to unnamed bidder.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 1400 tons, automobile storage building for New York Central Railroad at West End Avenue and Sixty-fifth Street; general contract bids taken June 18.

NEW YORK, 200 tons, viaduct at 241st Street over Bronx River Parkway.

MICHIGAN CITY, IND., 1000 tons, power plant.

CHICAGO, 100 tons, Win-Crest apartment hotel; C. Ronneberg, architect.

CHICAGO, tonnage not stated, 20-story garage; J. B. French Co., general contractor.

CHICAGO, 200 tons, apartment building at 1242 Lake Shore Drive.

SEATTLE, 2000 tons, City-County Building addition; general contract to Hans Pedersen.

Steel Boiler Plate Standards

Standard specifications for marine steel boiler plates have been approved as American marine standards. Pamphlet A.M.S.C. 62 covering the specifications may be obtained at 5c. from the superintendent of documents, Government Printing Office, Washington. Grade A has a tensile strength of 60,000 to 70,000 lb. per sq. in. and grade B of 5000 lb. less. The yield point in each case is at least one-half the tensile strength. The elongation in 8 in., expressed in percentage, is 1,500,000 divided by the tensile strength for grade A, and 1,550,000 divided by the tensile strength for grade B.

PERSONAL

FREDERICK M. BECKET, vice-president of the Electro Metallurgical Co. and of the Union Carbide Co., New York, sailed on June 14 for Italy with his family. He intends to visit Italy, France, Germany, England and Scotland, returning in the fall.

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THOMAS THORNTON READ, for the past three years assistant executive director of the American Institute of Mining and Metallurgical Engineers, has been appointed professor of mining in the school of mines of Columbia University, New York. ERIC RANDOLPH JETTE has been appointed a professor in the school of mines.

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F. L. DRIVER, JR., president, Driver-Harris Co., Harrison, N. J., recently sailed for Europe on a business trip.

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C. R. MESSINGER, president, Chain Belt Co., Milwaukee, has been elected a director of the Milwaukee Gas Light Co., part of the American Light & Traction Co., New York.

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JULIAN D. CONOVER, for the past seven years secretary of the Tri-State Zinc and Lead Ore Producers' Association, has been appointed secretary of the American Zinc Institute, New York, to succeed STEPHEN S. TUTHILL, whose resignation becomes effective Aug. 1.

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DAVID THOMSON has been elected vice-president of the Great Lakes Steel Corporation, Detroit.

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C. A. ALEXANDER, general manager of the Tata Iron & Steel Co., Jamshedpur, India, arrived on the Mauretania, June 6, on a six months' leave.

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WILLIAM S. JONES, formerly vice-president of the Carpenter Steel Co., Reading, Pa., has been made vice-president in charge of sales of the Universal Steel Co., Bridgeville, Pa., and the Cyclops Steel Co., Titusville, Pa., with headquarters in New York.

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EDWARD BAUSCH has resigned as general manager of the Bausch & Lomb Optical Co., Rochester, N. Y., and will be succeeded by M. HERBERT EISENHART, formerly assistant general manager and vice-president. Mr. Bausch retains his place as president of the company.

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RUSSELL HURLBUT, formerly of Hartford, Conn., has been made manager of the Paris office of Niles-Bement-Pond Co., New York.

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ROBERT E. NEWCOMB, recently resigned as superintendent of the Deane-Blake-Knowles, Holyoke, Mass., subsidiary plant of the Worthington Pump & Machinery Co., last week was presented a watch and chain and a letter of appreciation signed by 240 employees.

M. L. M. SOUGET, export manager, Société des Tuyaux Bonna, Paris, manufacturer of reinforced concrete pipe, and JEAN POCHAT, engineer of that company, are in New York for a few weeks on business, with headquarters at Manealoff & Co., 40 Rector Street, agents for Bonna pipe in the United States.

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H. B. MILLER, who has been manager of the Pittsburgh office of the Truscon Steel Co., Youngstown, has been appointed general manager of the company's Pacific Coast plant at Los Angeles, and has also been made a vice-president of the company. In addition to production, he will have charge of the Truscon branch offices at Seattle, Portland, San Francisco and Los Angeles, succeeding J. E. HEBER, who has resigned. Before going to the Pittsburgh office, Mr. Miller was a special sales representative of the company, with headquarters at the home office in Youngstown. He has been succeeded at Pittsburgh by W. H. KELLY. Mr. Kelly has recently been identified with the Chicago office and was previously in the highway products division at Youngstown.

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E. A. EMERSON, vice-president, Armco International Corporation, Middletown, Ohio, has been elected president of the Foreign Trade Association of the Cincinnati Chamber of Commerce.

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O. H. BROXTERMAN, for a number of years president of the John Steptoe Co., Cincinnati machine tool company, has established his own business in Cincinnati as a manufacturers' agent.

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J. F. HAHN has been made vice-president and treasurer in charge of finance, and THOMAS GULLEY has been made vice-president in charge of sales, of the National Enameling & Stamping Co., Inc., Milwaukee. Both have been identified with the company for many years.

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JOHN O. TUCKER, whose retirement as general manager of sales, Wheeling Steel Corporation, Wheeling, W. Va., was mentioned recently in THE IRON AGE, was given a farewell dinner by the division heads of the company on June 12 at the Wheeling Country Club. Mr. Tucker will enter the brokerage business at Wheeling. He assumed his recent position four years ago, after having served as Detroit district manager of the company for a number of years.

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FRANK J. DUTCHER, president since 1909 of the Draper Co., Hopedale, Mass., textile machinery, has resigned to become chairman of the board of directors. B. H. BRISTOW DRAPER, treasurer, succeeds Mr. Dutcher as president, and the treasurer's position will be filled by C. FREDERICK BUTTERWORTH, formerly assistant treasurer. G. RUSSELL GOFF is the new assistant treasurer.

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A. B. NEUMANN, of H. A. Brassert & Co., Chicago, returned to the United States June 17 after a sojourn of some months at Manchester, England, where he was engaged in reconditioning the works of the Partington Steel & Iron Co., for the London branch of the Brassert organization.

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W. F. MCKAY, chief engineer, International Oxygen Co., Newark, N. J., has returned after an extended business and pleasure trip to England, Scotland, France and Germany.

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HERMAN SCHNEIDER, dean of the engineering college, University of Cincinnati, has been elected president of the university. He has been acting as president for some months, but deferred acceptance of the position on account of ill health, a matter now corrected. Dean Schneider is well known as the one who first made a successful and large scale application of the "cooperative" system of education, wherein the student spends alternate periods in the school room and in some commercial organization engaged in his selected line of studies.

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SAM TOUR has been made vice-president of Lucius Pitkin, Inc., consulting chemist, metallurgist and analyst, New York. The firm has opened a branch office at 123 North Street, Batavia, N. Y., with Mr. Tour in charge.

Immigration at Low Point

WASHINGTON, June 15. — Immigrants to the number of 28,565 were admitted to the United States in April, according to the Bureau of Immigration, while the emigrants were 3387. Almost two-thirds, or 18,583, of the newcomers admitted during April to the United States for permanent residence came from Europe, Germany leading with 5373, followed by Great Britain with 2749, while the Scandinavian countries sent 2535, the Irish Free State, 2364; Italy, 1574; Poland, 1008; and Czechoslovakia, 565. During the 10 months ended with April, 231,477 immigrants entered the United States, the lowest number of permanent admissions for any like period since the present immigration law went into effect.

Otis Installing New Mills

The Otis Steel Co., Cleveland, has completed the construction of a new sheet warehouse and is installing three cold-rolling mills, which will increase its sheet output 1000 tons a month. An automatic drying machine is being installed for extra deep drawing sheets. This is expected to result in operating economies.

OBITUARY

CHARLES F. BRUSH, inventor of the arc light and distinguished scientist, died at his home in Cleveland, June 15, aged 80 years. He was born on a farm near Cleveland. After graduation from the University of Michigan, he was engaged as an analytical and consulting chemist in Cleveland from 1870 to 1873. During the next four years he was affiliated with the iron ore and blast furnace industry as a chemist. While engaged in these activities he devoted considerable attention to experiments in electricity and in 1877 he turned all his attention to the electrical field and in 1878 developed the Brush arc light. Numerous honors were bestowed upon Mr. Brush for his accomplishments in the electrical field. In 1881 he was made a Chevalier of the French Legion of Honor. In 1899 the American Academy of Arts and Sciences awarded him the Rumford medal for the practical development of the electric arc light. In 1913 the American Institute of Electrical Engineers awarded him the Edison medal. He was recently named national chairman of the American Philosophical Society's $2,250,000 campaign for an endowment and building fund.

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HENRY W. WENDT, president, Buffalo Forge Co., Buffalo, died of pneumonia at his home on June 12, aged 67 years. When only sixteen years old, he became associated with his brother, the late William F. Wendt, in the founding of the Buffalo Forge Co. Later he became works manager and vice-president and in 1916 was elected president. He was long prominently identified with the improvement of the art of heating and ventilation and general air conditioning.

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CLARENCE HAYWARD, formerly secretary and treasurer of the Domhoff & Joyce Co., Cincinnati, pig iron and coke dealer, was drowned June 15 when attempting to rescue his daughter from the waters of the Little Miami River near Cincinnati. He was associated with Domhoff & Joyce Co. for about 20 years, but resigned three years ago to devote his attention to Florida real estate. He was 53 years of age.

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J. P. SCHNEIDER, general manager, American Tool & Mfg. Co., Urbana, Ohio, died on May 31 following a stroke of apoplexy. He had been associated with the company since it was founded in 1914. He was a member of the American Society of Mechanical Engineers.

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WILLIAM A. MCDONALD, associated with the Milwaukee branch of the E. L. Essley Machinery Co., Chicago, was killed in an automobile accident on June 12, aged 55 years. He was widely known in the machine tool trade in Middle West.

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GEORGE DAMEREL, for many years well known in the steel trade in New York, died June 7 at his home at 460 Riverside Drive, New York. He was in his sixty-fifth year. For more than 20 years Mr. Damerel was with the American Tube & Stamping Co. of Bridgeport, Conn., in its New York sales office. Later he was with the Weirton Steel Co., and more recently with Steel & Tubes, Inc., now a subsidiary of Republic Iron & Steel Co.

DR. C. F. BRUSH

H. W. WENDT

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RALPH E. LUNDGREN died June 16 following an operation, aged 44 years. He at one time was a member of the Chicago sales organization of Hickman, Williams & Co. Later he became Chicago manager for the Matthew Addy Co. When that company went out of business, he organized the Lundgren, Stevens Co. to do a general sales business in pig iron and foundry specialties. Two years ago Mr. Stevens severed his connection with the concern and since that time Mr. Lundgren had continued it under the firm name of Lundgren, Stevens Co.

General Refractories Co. is moving its Cleveland office to 1126 Leader Building and its Buffalo office to 1210 Genesee Building.

Bethlehem Low Bidder for Light Cruiser

WASHINGTON, June 18.—With a bid of $10,753,000, the Bethlehem Shipbuilding Corporation, Quincy, Mass., submitted the lowest private yard figure for the construction of one of the five 10,000-ton light cruisers, for which bids and estimates were opened by the Navy Department last Saturday. The next to lowest private bid was that of $10,903,200 received from the New York Shipbuilding Co., Camden, N. J., while the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., put in a bid of $11,130,000.

Two of the ships are to be built in private yards and three in Navy Yards, according to the naval expansion program. The lowest estimate from the Navy Yards came from Puget Sound, whose figure was $8,838,000, the vessel to be built in 40 months. The Mare Island Navy Yard estimate was $9,308,880, the construction period 45 months; the Philadelphia Navy Yard bid was $10,285,906 for one ship within 42 months, or two ships over a period of 42 and 48 months respectively after the ways are ready, for $10,000,000 each; the New York Navy Yard bid for one vessel was $10,508,100 in 36 months and a second cruiser for $9,639,403 over a period of 42 months. The Boston yard put in an estimate of $11,895,931, with a construction period of 45 months.

The construction period of the private yards was 36 months in each instance, except that the Newport News yard bid provided for a period of 39 months if payments made prior to July 1, 1930, are limited to $1,000,000. It was stated that it will require some time to consider the bids carefully before the awards are announced.

Standards for Shafting

The American Society of Mechanical Engineers sectional committee on standards for shafting has authorized for distribution revisions of four of its present standards for general criticism and comment. They include an extended range of shafting diameters of 6½, 7, 7½, 8, 10, 12, 14 and 16 in., and introduce the use of a 5/16 in. square key and 5/16 x 1/4 in. rectangular or flat key for use on shafting diameters ranging from 1¼ to 1⅞ in.

Foote Brothers Gear & Machine Co., Chicago, manufacturer of speed reducers and industrial gearing, road graders and tractors, has opened a Western sales office at 1855 Industrial Street, Los Angeles, Cal., and has appointed S. Howard Eisenberg as district representative for Colorado, Wyoming and New Mexico, succeeding F. Ross Eberhard. Mr. Eisenberg's headquarters is at 2812 Ash Street, Denver, Colo.

Machinery Markets and News of the Works

No Decline in Output

Machine Tool Orders Taper Off Slightly, But Shop Operations Will Show No Early Let-down

ALTHOUGH sales of machine tools are tapering off slightly this month, it is definitely indicated that the volume of unfilled orders, together with this month's bookings, will keep machine tool plants engaged at about the present rate through the summer months.

Business this month has not come from a relatively few large buyers, but has been placed in small lots by a wide range of industries.

The industry probably has never experienced such a large demand for its products at this time of the year.

Automobile manufacturers are not expected to buy much new equipment during the summer, but one or two accessory manufacturers probably will buy considerable equipment soon.

The farm implement industry in the Chicago district is showing more interest in new tools. Some sizable lists are in prospect for plant additions. Last year that industry took 60 to 70 per cent of all of the tools sold in the Chicago district. This year's sales have been large, but the percentage has been smaller, owing to the increased demands from other industries.

The airplane industry is a steady buyer. It now appears that the purchases of the Curtiss-Caproni Corporation for its Baltimore airplane plant will total several hundred thousand dollars in value. Considerable shop equipment in addition to machine tools will be bought. Orders are expected before the end of the month.

Twenty-five tools are inquired for by the Cleveland Union Terminals Co., Cleveland, for an electric locomotive repair shop.

Commenting on the May showing of the machine tool industry, when unfilled orders reached a new high total, the National Machine Tool Builders' Association says:

"May figures on machine tool orders indicate that the month's orders were again very high, and that machine tools are still in very strong demand. However, the signs and portents that are being manifested by other industries still lead us to believe that activity is not likely to continue at the present level.

"The present machine tool demand is not as great in percentage from the automobile industry as has been the case in previous years. General industry seems to be buying the machine tools. Orders are not concentrated in a few large automobile companies."

The association further comments that the present demand is not a boom, but that industry is "simply catching up with the ordinary replacement demand that seems to have been backed up since the war."

New York

NEW YORK, June 18.—A slight falling off in machine tool orders occurred during the first half of the month, as compared with May, but the orders to be placed by the Curtiss-Caproni Corporation for its new airplane plant at Baltimore will probably help to bring up sales records during the latter half. It is understood that these orders will be placed within the next two weeks. In addition to machine tools, the company will buy a large amount of other equipment, including heat-treating equipment, furnaces, etc. Expenditures will probably run into several hundred thousands of dollars.

Inquiries are fairly numerous, but prospective buyers are a little slower in closing than has been the case recently. Deliveries of most types of tools have not improved. Few machine tool companies were able last month to ship as many machines as were ordered. The Nichols Copper Co., New York, is in the market for several tools to be shipped to El Paso, Tex.

Plans are under way by Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, for extensions and improvements in assembling plant at Tarrytown, N. Y., to increase daily output from 700 to 1200 cars, to cost over $3,000,000 with machinery. A number of structures now in use are scheduled to be taken over on completion of program, by Fisher Body Corporation, Detroit, an affiliated organization, for production of bodies for Chevrolet automobiles.

Department of Water Supply, Municipal Building, New York, has awarded general contract to John Martin, 639 East 235th Street, for two-story mechanical and repair shop, to cost about $50,000 with equipment. William Shary, 41 Union Square, is architect.

New York Power & Light Corporation, 126 State Street, Albany, N. Y., a subsidiary of Mqhawk-Hudson Power Corporation, same address, has awarded general contract to Stevens & Wood, Inc., 20 Pine Street, New York, engineer, for hydroelectric generating plant at Conklingville, N. Y., to cost more than $750,000 with equipment; extensions will be made in transmission lines.

William Shary, 41 Union Square, New York, architect, has plans for a four-story automobile service, repair and garage building, 90 x 100 ft., to cost about $100,000 with equipment.

Eagle Bronze Works, Inc., 10 North Bleeker Street, Mount Vernon, N. Y., has awarded general contract to Barbaresi & Son, 20 East First Street, for a four-story addition, and improvements in present plant, to cost about $45,000 including equipment. George M. Bartlett, 103 Park Avenue, New York, is architect.

Moto-Meter Gauge & Equipment Corporation, 11 Wilbur Avenue, Long Island City, recently formed to take over and consolidate Moto-Meter Co., address noted, and Safe-T-Stat Co., Brooklyn, manufacturers of automobile accessories, will concentrate production at three main plants at Toledo, Ohio; La Crosse, Wis.; and Long Island City, with headquarters at last noted works. A plant will be operated also at Toronto, and another in Germany.

Borden Farm Products, Inc., 110 Hudson Street, New York, has taken title to property at Mount Vernon, N. Y., and is considering new automatic bottling plant. An automobile service and repair garage will also be built for company cars. Project will cost more than $350,000.

Stern Brothers Motorcycles, Inc., 1790 First Avenue, New York, has purchased two-story building, 25 x 100 ft., at 336 East Ninety-second Street, for expansion in service and repair division. Company

owns adjoining property and will occupy later for further mechanical service.

DeLaval Separator Co., Pine Street, Poughkeepsie, N. Y., manufacturer of clarifiers, filters, separators, etc., has awarded general contract to L. H. Swenson, 39 Market Street, for one-story foundry addition, to cost more than $100,000 with equipment. Headquarters are at 165 Broadway, New York.

American Platinum Works, Inc., 231 New Jersey Railroad Avenue, Newark, has awarded general contract to Edward M. Waldron, Inc., 40 Park Place, for a one and one-half story addition, 40 x 125 ft., to cost about $50,000 with equipment. Frederick A. Phelps, 21 Fulton Street, is architect and engineer.

Sonatron Tube Co., 57-59 State Street, Newark, manufacturer of radio tubes and equipment, plans early construction of six-story addition, 67 x 120 ft., to cost over $125,000 with equipment. Siegler & Greenberg, 164 Market Street, are architects.

Packard Motor Car Co. of New York, Broadway and Sixty-first Street, New York, and 198 Central Avenue, Newark, has asked bids on general contract for a three-story service, repair and sales building, 200 x 206 ft., to cost $300,000 with equipment. Edward C. Epple, 44 Commerce Street, Newark, is local architect in charge.

Pennsylvania Railroad Co., Pennsylvania Terminal, New York, has plans for initial unit of cold and dry storage terminal at Jersey City, N. J., to cost more than $4,000,000 with equipment. First building will be of multi-story type, for cold storage and refrigerating service, to cost about $750,000 with machinery.

W. H. Chapman, 229 Mulberry Street, Newark, manufacturer of bank note machinery and parts, has acquired property, 95 x 100 ft., as site for new one-story plant, to cost about $25,000, and will remove to new location.

New York Art Iron Works Corporation, 653 First Avenue, New York, has been incorporated, succeeding to business of Oscar Luetke. New Company will continue manufacture of ornamental handwrought iron and bronze. Jacob Sesek is president and John Leopold, vice-president.

Philadelphia

PHILADELPHIA, June 17.—Contract has been let by Reading Co., Philadelphia, to William Steele & Sons Co., 124 North Fifteenth Street, for twelve-story storage and distributing plant, to include mechanical loading and handling facilities, etc., to cost about $2,500,000.

Belmont Packing & Rubber Co., 1133 Arch Street, Philadelphia, manufacturer of mechanical rubber goods, has awarded general contract to Kessler Contracting Co., 1733 North Marvine Street, for rebuilding part of one and two-story plant recently destroyed by fire.

Pitcairn Aviation, Inc., Land Title Building, Philadelphia, has disposed of its air mail and other flying service lines, totaling about 1500 miles, to C. M. Keys, head of Curtiss Flying Service, Inc., 27-29 West Fifty-seventh Street, New York, and associates, which will operate as unit of flying system. Pitcairn interests, including Pitcairn Aircraft, Inc., Bryn Athyn, Pa., will devote operations in future to manufacture, and will concentrate on production of a plane with revolving wings, known as Autogiro, developed in England by La Cierva Autogiro Co., and for which American rights have been secured. New parts and assembling plant will be built for this purpose at Hallowell, Pa., to cost about $100,000 with equipment, and following completion present works at Bryn Athyn, will be remodeled and equipped for experimental work. Harold F. Pitcairn is head.

General Motors Corporation, General Motors Building, Detroit, has acquired through its subsidiary, Argonaut Realty Corporation, 58,000 sq. ft., on Hunting Park Avenue, Philadelphia, and will build a service, repair and sales building to be occupied by United Motors Service, Inc., 342 North Broad Street, an affiliated organization, to cost more than $150,000 with equipment.

Victor Metal Aircraft Co., Wilson Building, Camden, N. J., is planning construction of plant at Mount Holly, N. J., for parts manufacture and assembling of airplanes to cost $65,000 with equipment. H. B. Smith, Mount Holly, is architect.

Officials of Proctor & Schwartz, Inc., Seventh Street and Tabor Road, manufacturer of drying machinery, air-conditioning equipment, etc., have organized Proctor & Schwartz Electric Co., a subsidiary, to manufacture electrical equipment. Incorporators include Walter M. Schwartz and Joseph Tiers, Jr.

Millersburg Gas Corporation, Millersburg, Pa., represented by J. W. Swain, Jr., Land Title Building, Philadelphia is planning new artificial gas plant to cost about $160,000 with equipment.

Wilkening Mfg. Co., Fifteenth Street and Mount Vernon Avenue, Philadelphia, manufacturer of piston rings, radio equipment, etc., has acquired one-acre tract adjoining plant and is said to be planning construction of addition, to cost more than $70,000 with equipment.

Zerbe Township School Board, Trevorton, Pa., is considering installation of manual training equipment in new three-story high school to cost $250,000, for which plans are being completed by C. Howard Lloyd and John G. Todd, 216 Locust Street, Harrisburg, Pa., associate architects.

Eaton Bumper & Spring Service Co., 6515 Carnegie Avenue, Cleveland, subsidiary of Eaton Axle & Spring Co., East 140th Street, same city, has leased one-story building, 72 x 170 ft., to be erected at 1521-27 North Thirty-third Street, Philadelphia, for new branch plant. It will be owned by Samuel S. Lear & Co., 720 Wolf Street, Philadelphia, who have let general contract to Stanley Construction Co., same address.

The Crane Market

BUSINESS in locomotive cranes is good, with some substantial orders pending. The Amtorg Trading Corporation, New York, is in the market for a number of small, crawl-tread locomotive cranes. The Baltimore & Ohio Railroad, which recently inquired for eight gasoline or Diesel motor-driven locomotive cranes, is expected to buy the latter type. The Corson Construction Co., New York, which has just received the award of a subway contract involving 34,000 tons of structural steel, is expected to be in the market for small shovels and some truck cranes soon. The overhead crane market is rather quiet, but some substantial business is pending. The Libby-Owens Sheet Glass Co., Toledo, Ohio, is in the market for 12 overhead electric cranes.

Among recent purchases are:

Cities Service Co., Boston, 10-ton crawl-tread crane from Browning Crane Co.

Florence Thread Co., Riverside, N. J., 2-ton, 16-ft. span, 3-motor overhead crane from Box Crane & Hoist Corporation.

Carnegie Steel Co., Farrell, Pa., two 8-ton, 63-ft. span, 6-motor cranes from Morgan Engineering Co.

Buffalo

BUFFALO, June 17.—Contract has been let by Crouse-Hinds Co., Wolf and Seventh Streets, Syracuse, N. Y., manufacturer of electrical products, condulets, etc., to Dawson Brothers, Union Building, for a two and three-story addition, to cost $135,000 with equipment. Gaggin & Gaggin, First Trust & Deposit Building, are architects.

Aletha Hutchinson, Alexandria Bay, N. Y., and associates have organized Hutchinson's Boat Works, with capital of $75,000, and will establish local plant for boat-building and repair work.

Rochester Packing Co., 900 Maple Street, Rochester, N. Y., has plans for three new units, comprising cold storage and refrigerating plant, steam power house, and automobile service, repair and garage building for company trucks and cars, to cost about $250,000 with equipment. Henschien & McLaren, 1637 Prairie Avenue, Chicago, are architects and engineers.

Bagley & Sewall Co., Watertown, N. Y., manufacturer of pumping machinery, paper mill equipment, etc., has begun construction of new power plant, 28 x 45 ft., to cost about $45,000 with equipment

Syracuse Washing Machine Corporation, Syracuse, N. Y., has purchased division of business of Splitdorf-Bethlehem Electrical Co., 392 High Street, Newark, N. J., covering manufacture of "Rol-Iron" ironing machines for domestic service, and will consolidate. Purchasing company will increase facilities for production of ironing machine equipment.

New England

BOSTON, June 17.—Sales reported the past week by dealers in new machines were spotty, but larger than for the previous week. Business was largely confined to plants in western Massachusetts and Connecticut, and for the most part was for extended delivery. Sales included a large boring mill and gear cutting equipment for November delivery, 16-in. high-speed lathes and a planer for December delivery, presses and cutting off tools for October delivery. There appears to be a scarcity of good used tools. New England machine tool builders so far this month have taken less new business than during the first half of May, but most of them have sufficient backlogs to insure current operations for several months.

Some falling off is noted in demand for small tools, but manufacturers of the leading lines are heavily booked.

Bay State Abrasive Products Co., Westboro, Mass., has plans for additional manufacturing units.

Texas Co., 31 St. James Avenue, Boston, will close bids June 20 for a one-story repair shop, 95 x 136 ft., Chelsea, Mass.

City of Dighton, Mass., will build a grade school addition to contain a manual training department. Charles S. Chase is chairman of commission in charge.

Nantucket Co., Nantucket, Mass., has plans for a wood-working plant. Equipment includes wood-working machinery, circular saw, lathe, band saw, all motor driven.

Plans are being drawn by New Departure Mfg. Co., Valley Street, Bristol, Conn., manufacturer of ball bearings, etc., for new steam power house, to operate with oil fuel. Company will also construct oil storage and distributing plant for fuel oil supply, to cost more than $80,000 with equipment. Lockwood Greene Engineers, Inc., 24 Federal Street, Boston, is engineer.

Boston & Maine Railroad Co., North Station, Boston, has awarded general contract to H. Wales Lines Co., Meriden, Conn., for new engine house with repair facilities at Westboro, N. H.

United Feldspar Corporation, 10 East Fortieth Street, New York, recently organized to take over and consolidate group of Feldspar producing companies in Maine, New York and other points, will expand plant of Oxford Mining & Milling Co., West Paris, Me., including installation of equipment to double present capacity. A tramway system will be built from mines to mill. C. H. Peddrick, Jr., is vice-president.

Mossberg Pressed Steel Co., 81 West Street, Attleboro, Mass., has awarded a general contract to E. G. Pineo, 58 Hawthorne Street, for a one-story addition, 60 x 145 ft., to cost about $50,000 with equipment.

Holyoke Water Power Co., Holyoke, Mass., is planning construction of two hydroelectric power plants, at points known as overflows Nos. 3 and 4. Water turbines will be installed, direct-connected to generating units. Entire project will cost about $125,000.

Rainbow Light, Inc., 3166 Washington Street, Boston, manufacturer of electric signs and displays, will expand local plant, particularly line of luminous tube units. Miles Pennybacker is manager in charge of New England operations.

American Electro Metal Corporation, Lewiston, Me., has authorized an addition to new plant unit now in course of construction, work to begin soon. In fall, company will develop increased production and will construct additional buildings at that time, including foundry. Entire project will cost more than $150,000.

Waterbury Machinery & Metal Corporation, Waterbury, Conn., has been incorporated to sell new and used machinery.

Pittsburgh

PITTSBURGH, June 17.—Orders for machine tools and other machinery the past week were not quite so large as in the previous week. A number of individual tools were closed and four milling machines were placed with one dealer. New inquiry is in good volume and local offices are busy preparing estimates on equipment that will probably be placed in the late summer or early fall. Third quarter tool lists of the railroads and large manufacturing plants in this territory have not been released, but information points to rather heavy purchases for that period.

Favorable weather has aided construction at the large plant expansion jobs in this district and the heavy equipment for some of this work will be placed before fall. Pittsburgh district equipment companies are interested in requirements of the Newton Steel Co. for its new plant at Monroe, Mich., which is expected to be in operation by the first of the year. The plant of the Great Lakes Steel Corporation is also underway and will probably be completed within a year. Considerable activity in the Youngstown district is noted.

Contract has been let by Westinghouse Electric & Mfg. Co., East Pittsburgh, to D. T. Riffle, 1006 Forbes Street, Pittsburgh, for one-story addition to branch plant at Wilmerding, 65 x 175 ft., to cost about $100,000 with equipment.

Officials of Pittsburgh Stove & Range Co., Preble Avenue, Pittsburgh, have organized new company of same name, capitalized at $400,000, to take over and expand present organization. In addition to stoves and ranges, general iron foundry will be operated, as well as division for production of fabricated steel products. Incorporators include Robert V. Bingay and Carl A. Karthauser; late noted is treasurer.

Fourth Avenue Garage, 548 Fourth Avenue, Pittsburgh, will soon take bids for a seven-story service, repair and garage building, to cost about $300,000 with equipment. D. A. Crone, 212 Oliver Avenue, is architect.

Oil Well Supply Co., Clark Building, Pittsburgh, is arranging for concentration of production at plant at Oil City, Pa., and during summer plans removal of different manufacturing departments from Pittsburgh to that plant, which will be expanded. Engineering department will also be removed to Oil City works.

Texas Corporation, 17 Battery Place, New York, will build new storage and distributing plant at Beaver, Pa., to cost about $45,000 with equipment.

International Nickel Co., 67 Wall Street, New York, will expand Monel metal plant at Huntington, W. Va., to include installation of electric furnace and other equipment, to cost about $200,000. Arthur S. Shoffstall is general manager at plant.

Detroit

DETROIT, June 17.—Arrangements have been made by Andrix Lock Nut Co., Adrian, Mich., for purchase of plants and business of Flint Novelty Co., Flint, Mich., manufacturer of toy aircraft, jar openers, etc. Flint plant will be removed to Adrian, where expansion will be carried out.

Board of Water and Light Commissioners, Lansing, Mich., has plans for an addition to Moores River Park municipal electric light and power plant, including additional equipment, to cost more than $300,000. J. E. Woodwell, 501 Fifth Avenue, New York, is consulting engineer.

Mack-Craft Amphibian Corporation, Plymouth, Mich., has work under way on new plant for manufacture of amphibian planes, including parts production and assembling department, to cost more than $40,000 with equipment.

Chevrolet Motor Co., West Kearsley Street, Flint, Mich., has plans for new one-story unit, to cost over $150,000 with equipment. Wright & Nice, Dort Building, are architects.

Evans Auto Loading Co., Dime Bank Building, Detroit, manufacturer of automobile loading equipment and devices, is planning expansion in Pacific Coast branch plant, known as floor board division, to increase capacity more than 50 per cent, to cost over $85,000 with equipment.

Sky Specialties Corporation, Detroit, has been organized with capital of 200,000 shares of stock, no par value, to take over and consolidate Heyward Starter Co., and Simon Airplane Appliance Co., both with local plants. New company is planning expansion and installation of additional equipment.

W. K. Kellogg Co., Battle Creek, Mich, manufacturer of cereal foods, etc., plans new multi-story mill addition, with installation of ovens, conveying equipment, and other mechanical handling apparatus and automatic packaging machinery, to cost over $800,000.

Oxford Radio Corporation, Chicago, care of Chamber of Commerce, Muskegon, Mich., has leased property at Muskegon, heretofore used by Sommers Machine Co., and will remodel for new plant to manufacture loud speakers and other radio apparatus. Chicago works will be removed to Muskegon where production will be concentrated.

South Atlantic

BALTIMORE, June 17.—Harrison, Brothers, Twenty-fifth and Aiken Streets, Baltimore, operating an automobile service, repair and garage building, will have revised plans drawn for a one-story addition, to cost about $100,000 with equipment. Stanislaus Russell, 11 East Lexington Street, is architect.

Southern Railway Co., Washington, is planning early rebuilding of engine house, shops and other buildings at Oakdale, Tenn., recently destroyed by flood, to cost more than $400,000. Company will also rebuild similar structures at Harriman, Tenn., likewise damaged, to cost about $150,000.

Mueller Co., Decatur, Ill., manufacturer of brass pipe, plumbing equipment, etc., is having plans prepared for a two-story factory branch at Atlanta, Ga., to cost about $90,000 with equipment. McDonald & Co., Southeastern Trust Co. Building, Atlanta, are architects and engineers.

Globe Iron Construction Co., 906 West Olney Road, Norfolk, Va., is said to have plans for first unit of new local works for production of ornamental iron and structural steel, one-story, 75 x 150 ft., to cost about $65,000 with equipment. It is proposed to build other units later.

Southern Public Utilities Co., Charlotte, N. C., operating electric light and power properties at Charlotte, Winston-Salem, and other points in North and South Carolina, has arranged for bond issue of $8,000,000, part of fund to be used for extensions and improvements in power plants and system, including acquisition of other utility properties. E. C. Marshall is president.

F. S. Royster Guano Co., Royster Building, Norfolk, Va., manufacturer of fertilizer products, has acquired property at Jackson, Miss., and approved plans for new branch plant with main unit, one-story, 175 x 600 ft., to cost more than $150,000 with machinery. Works will include a bag-loading plant boiler house, machine shop and other departments.

United States Coast Guard, Darby Building, Fourteenth and E Streets, N. W., Washington, has authorized plans for a one-story machine shop at Coast Guard Station in Baltimore district, to cost $25,000. P. J. Latham, 1410 Pennsylvania Avenue, N. W., is architect.

Richard C. Lee and S. S. Coston, Hampton, Va., associated, plan rebuilding of part of local fertilizer plant, destroyed by fire June 9.

American Gas Co., 1401 Arch Street, Philadelphia, is planning new artificial gas

plant near Pulaski, Va., to cost $250,000 with machinery. Company has secured franchises in several cities in that vicinity, including Pulaski and Dublin.

United Motors Service, Inc., 406 West Peachtree Street, Atlanta, Ga., an interest of General Motors Corporation, Detroit, has leased three-story building, 160 x 190 ft., to be erected at West Peachtree Street and Grant Place, to cost about $180,000 with equipment. Ivey & Crook, Candler Building, Atlanta, are architects.

Godfrey Marble & Tile Co, Inc., H. M. Godfrey, Ashby Street, Atlanta, Ga., head, has leased raw material property near Cuthbert, Ga., and plans installation of stone quarrying plant, with mill, loading and distributing facilities, etc., to cost more than $50,000.

Cincinnati

CINCINNATI, June 17.—A slight recession in machine tool buying is noted, but many builders report bookings at or near the May level. Although no large transactions have been closed recently, the absence of sizable orders has been offset by the large number of sales of one or two machines each. Increased interest in standard tools is shown, this development being accounted for by the fact that business lately has come mostly from all classes of buyers rather than from a few important users asking for machines of special design.

One or two automobile accessory manufacturers are said to be contemplating machine tool purchases, but automobile makers are not expected to be in the market on a large scale during the summer. Production in local shops is being maintained at capacity and unfilled orders are sufficient to insure operations at the present rate until September.

Department of Service, City Hall, Cincinnati, has plans for hangar at Lunken airfield, 485 ft. long, with repair and reconditioning facilities, to cost about $60,000 with equipment. Kruckemeyer & Strong, St. Paul Building, are architects.

Waco Aircraft Co., Troy, Ohio, has arranged for sale of stock issue, totaling $587,000, part of fund to be used for expansion. Company was formerly known as Advance Aircraft Co., and specializes in three-passenger aircrafts. C. J. Brukner is president.

Dayton Light, Heat & Power Co., East First Street, Dayton, Ohio, has plans for an addition to steam-operated electric power plant, to cost about $200,000 with equipment. Company is operated by Columbia Engineering & Management Corporation, Cincinnati.

American Fork & Hoe Co., Keith Building, Cleveland, is said to be planning to rebuild part of branch plant at Harriman, Tenn., recently destroyed by flood, to cost over $40,000 with equipment.

Mid-South Aircraft Corporation, care of Ira Allstadt, Jr., 4 West Norwood Street, Memphis, Tenn., recently formed by Mr. Allstadt and associates, with capital of $100,000, is said to be planning operation of local plant to manufacture airplanes and parts.

Plant and business of J. T. Towsley Mfg. Co., 1037 Evans Avenue, Cincinati, manufacturer of wood-working machinery, factory trunks, etc., has been acquired by J. D. Wallace & Co., 134 South California Avenue, Chicago, manufacturers of kindred equipment, who will consolidate. Cincinati plant is expected to be continued as branch works.

William Carroll, Norwood, Cincinnati, has awarded general contract to Norwood Concrete Building Construction Co., Norwood, for a one-story machine shop.

Chicago

CHICAGO, June 17.—As June advances sales taper, but at a slower rate than in recent years. There are, however, favorable factors for a heavier volume of business than is usual during the summer. Outstanding requests for prices bulk large for this time of the year. Much of this is active and is spread over a large part of the Mid-Western states.

The farm implement industry is showing greater interest in the market both in current purchases and prospective lists for plant additions. Last year 60 to 70 per cent of local sales were made to the farm machinery industry. Although sales this year have been large, the percentage is smaller, indicating the broader market recently. Radio manufacturers are moderately active while the airplane industry is a consistent buyer of machine tools. The Chicago & North Western has ordered a 25-in. upright drill.

Calumet & Arizona Mining Co. will spend $470,000 for a new steam power plant at its Junction shaft in Bisbee district, Arizona.

Otis Elevator Co., Quincy, Ill., is building a foundry extension, 120 x 160 ft.

Robinson Refrigerator Works has leased about 28,000 sq. ft. of space at 3812 West Pershing Road, Chicago. Company has plans for erection of its own building to contain about 35,000 sq. ft. with provision for expansion.

Commonwealth Edison Co., 72 West Adams Street, Chicago, will build a three-story brick switch house, 35 x 159 ft., to cost $300,000. Holabird & Root, 333 North Michigan Avenue, are architects.

Automatic Screw Machine Co., 3419 West Thiry-first Street, Chicago, will build a one-story addition, 42 x 100 ft., to cost $20,000. J. M. Haskins, 2837 West Madison Street, is architect.

Cameron Can Machine Co., 240 North Ashland Avenue, Chicago, has plans for a one-story brick factory, 95 x 98 ft., to cost $30,000. Thiellan & Sigard, 209 East Superior Street, are architects.

Zouri Drawn Metals Co., Chicago Heights, Ill., has plans for an extension to cost about $30,000.

Contract has been let by Waukegan Tool & Die Co., Terminal Building, Waukegan, Ill., to Petersen & Weeks Co., 1117 Washington Street, for one-story addition, 50 x 100 ft., to cost $30,000 with equipment.

Department of Public Works, City Hall, Springfield, Ill., W. J. Spaulding, commissioner, is having plans drawn for an addition to municipal electric light and power plant, to cost $75,000 with equipment.

Morton Salt Co., 208 West Washington Street, Chicago, has awarded general contract to J. B. French, 30 North Michigan Avenue, for two-story plant unit, 220 x 530 ft., to cost about $300,000 with equipment. Graham, Anderson, Probst & White, 30 East Jackson Boulevard, are architects.

Minneapolis-Honeywell Regulator Co., Fourth Avenue South, Minneapolis, Minn., manufacturer of heating equipment, has awarded general contract to Pike & Cook, 416 South Fifth Street, for six-story addition, to cost about $225,000 with equipment. Vanderbilt & Dege, 1645 Hennepin Avenue, are architects. H. W. Sweatt is vice-president and general manager.

Oliver Mining Co., Paonia, Colo., plans extensions and improvements at local Oliver mine, including tipple and machinery for conveying, loading, etc., to cost $90,000.

Western Screw Mfg. Co., 4413 West Kinzie Street, Chicago, has plans for a new one and two-story plant, totaling about 63,000 sq. ft. floor space, to cost over $100,000 including equipment. Adjoining site has been secured. A. Epstein, 2001 Pershing Road, is architect and engineer.

Universal Stamping & Mfg. Co., 2839 South Western Avenue, Chicago, has completed an addition, and has expanded its line of products to include a motion picture machine and radio equipment.

Waco Tool Works, Inc., 5216 West Kinzie Street, Chicago, is now operating in its new plant. Within 60 days it will bring out a new portable saw and sander.

Vulcan Stamping & Mfg. Co., 4036 West Lake Street, Chicago, has completed two new buildings and has expanded its line of work to include welding, specializing in electric seam and spot welding of gasoline tanks.

Victor Products Corporation, 2635 Belmont Avenue, Chicago, screw machine products, etc., will begin construction of a new plant in about 60 days.

Service Tool & Die Mfg. Co., 2256 Walnut Street, Chicago, is building a new plant at 4625 Fulton Street, which will be occupied in September. C. Danielson is president.

Badger Tool & Mfg. Co., 134 South Clinton Street, Chicago, has been reorganized with following officers: A. W. Korchan, president; H. F. Domish, general manager. R. M. Birch, former president, has sold his interest. Metal specialities have been added to lines manufactured, which hitherto have consisted mainly of tools and dies.

Sargent Machine Co., Fort Dodge, Iowa, manufacturer of drag line and excavating machinery, is erecting an addition which will provide considerable increase in production facilities. E. T. Lizenby is president.

Work has been started on erection of a new plant by George D. Roper Corporation, manufacturer of gas ranges and pump machinery. Building will be 400 x 450 ft. and is scheduled for occupancy Nov. 1.

Model Brass Foundry, Decatur, Ill., is erecting an addition to its plant, including a machine shop, 24 x 40 ft., which will double former capacity.

Milwaukee

MILWAUKEE, June 17.—The first half of June has produced a substantial volume of business for local machine-tool shops, and while activity is slightly less than earlier in the year, it is considerably above a year ago, and much better than the normal volume for this month. The automotive industry is buying sparingly, apparently having covered present needs. The major share of new business is in single tools.

With & Tremain Machine Co., 717 South Pierce Street, Milwaukee, have started work on a new one-story shop building, 50 x 128 ft., and will purchase some equipment. Total investment is about $35,000.

J. E. Wallace & Son, 1117 Division

Street, LaCrosse, Wis., are low bidders at $46,000 for constructing an addition to LaCrosse vocational school at Sixth and Vine Streets. No date has been set for taking bids on shop equipment. G. M. Wiley is director.

Hamilton Mfg. Co., Two Rivers, Wis., manufacturer of wood and metal printing house equipment and supplies, has plans for an addition, 40 x 300 ft., to shipping room and will also build a train shed and loading platform, 44 x 300 ft. Estimated cost is $100,000.

Gillett Rubber Co., Eau Claire, Wis., has placed contracts for a three-story factory and warehouse addition, 87 x 240 ft., with third story, 160 x 240 ft., over an existing two-story unit.

C. Kelmhofer, highway commissioner, Taylor County, Medford, Wis., is taking bids for erection and equipment of a machine shop, 50 x 70 ft., for servicing County equipment. Investment will be about $25,000.

Greene Mfg. Co., 1028 Douglas Avenue, Racine, Wis., manufacturer of hardware specialties, has broken ground for a brick and steel addition, to cost about $40,000 complete. F. J. Greene is president and general manager.

Wisconsin Metal Products Co., Racine, Wis., has plans by Frank J. Hoffman, local architect, for a one-story addition, 56 x 136 ft.

Board of Vocational Education, Racine, Wis., closes bids June 24 for furnishing plans, specifications and architectural advisory service on proposed new vocational school, at Eighth and Center Streets. First unit to cost about $250,000. T. S. Rees is director of vocational education.

Cleveland

CLEVELAND, June 17.—A good volume of inquiry came out during the week and sales were fair, although business shows a tapering off compared with last month. A list of about 25 machines, including some large tools, was sent out during the week by the Cleveland Union Terminals Co. for its electric locomotive repair shops. Bids on these are to be received June 24.

The New York Central Railroad is inquiring for a quartering machine for its Collinwood shops. Aluminum Co. of America purchased a 53-in. vertical boring mill and is inquiring for an open side planer for the new forge and die shop that it will erect for its United States Aluminum Co. plant in Cleveland. Oakland Motor Co., Pontiac, Mich., purchased three turret lathes from a Cleveland manufacturer and is reported to be buying some other equipment.

A Cleveland manufacturer of turret lathes reports that its sales, while not as heavy as recently, are still in excess of production. Most of the machine tool business at present is in single units, largely for replacement or filling in. Deliveries in some lines show quite a little improvement over two weeks ago.

List of Cleveland Union Terminal Co.

Car wheel lathe
Journal turning lathe.
Engine lathe.
Tool room lathe.
Car wheel press.
Vertical boring and turning mill.
Vertical boring and turning mill with side head.
Planer.
Horizontal milling machine.
Shaper.
Radial drill.
Drill press.
Speed drill press.
Punch and shear.
50-ton hydraulic bushing press.
Pipe cutting and bolt heading machine.
Power hammer.
Grinding machines.
Portable power hoist.

The Firestone Tire & Rubber Co., Akron, has organized the Firestone Battery Co., a subsidiary, which will shortly begin erection of first unit of a two-story, 50 x 100 ft. plant to manufacture batteries for automotive and other uses.

Norton Co., Worcester, Mass., manufacturer of abrasives, and other products will establish a distribution warehouse in Cleveland in a two-story and basement building, 100 x 140 ft., to be erected at East Fifty-fifth Street and Hamilton Avenue.

Drop Dies & Forgings Co., Cleveland, has been organized as a consolidation of the Drop Die & Engineering Co. and Drop Die Forging Co., both at 3092 East Sixty-third Street. A factory addition and office building were recently completed.

Hillwood Mfg. Co., Cleveland, will erect an addition, and will install machinery for manufacture of nails, tacks and other products.

Cleveland Union Terminals Co. will erect an electric locomotive repair shop, 171 x 304 ft., in Collinwood, an inspection shop, 39 x 198 ft. and other shops in Linndale.

Bids have been asked on general contract by Cleveland Institute of Aviation, Inc., Society for Savings Building, Cleveland, for hangar with repair and reconditioning facilities, and office building, at air field, Brook Park, Ohio, to cost about $100,000 with equipment. Allen Osborn Co., Rose Building, is architect and engineer.

Lamb Baking Co., West Fiftieth Street and Lorain Avenue, Cleveland, is having plans drawn for a one-story repair shop, 40 x 120 ft., to cost about $45,000 with equipment. Anders & Reimers, Erie Building, are architects.

McKay Machine Co., Youngstown, manufacturer of metal-working and automotive machinery, parts, etc., is planning an expansion and improvement program, to cost about $100,000.

Bender Body Co., 6409 Barberton Avenue, Cleveland, manufacturer of automobile bodies, has plans for one-story plant unit, 135 x 170 ft., to cost about $140,000 with equipment.

St. Louis

ST. LOUIS, June 17.—Contract has been let by McGregor Hardware Co., 301 St. Louis Street, Springfield, Mo., to M. E. Gillioz, Monett, Mo., for four-story storage and distributing plant, 100 x 145 ft., to cost about $100,000 with equipment. Earl Hawkins, McDaniel Building, is architect.

St. Louis-San Francisco Railway Co., Frisco Building, St. Louis, has plans for a one-story machine shop, 80 x 100 ft., at Fort Smith, Ark., shops, to cost about $35,000 with equipment. F. G. Jonah is chief engineer.

General Motors Corporation, Detroit, has awarded general contract to H. W. Underhill Construction Co., 235 North Waco Street, Wichita, Kan., for one and two-story service, parts and factory branch at Wichita, to cost about $85,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Phillips Petroleum Co., Bartlesville, Okla., has purchased 80-acre tract at Wichita, Kan., as site for new gasoline refinery, to handle 5000 bbl. crude oil per day to cost over $250,000 with machinery.

Alexander Aircraft Co., Colorado Springs, Colo., J. D. Alexander, president, is said to have plans for new one-story assembling plant near St. Louis, to cost about $40,000 with equipment.

Independent Oil & Gas Co., Kansas City, Mo., is planning to rebuild part of local oil refinery recently destroyed by fire.

Century Electric Co., 1806 Pine Street, St. Louis, has acquired plant and business of Roth Brothers & Co., 1400 West Adams Street, Chicago, manufacturer of dynamos, power motors and other electrical equipment, and will consolidate. It is proposed to continue Chicago plant as a branch factory, with transfer of certain products for production at St. Louis.

Ovens, power equipment, conveying and other machinery, will be installed in baking plant and coffee-roasting factory to be erected by Bird Stores, Inc., 2101 Broadway, Kansas City, Mo., to be four stories, to cost $200,000 with equipment. Archer & Gloyd, Pioneer Trust Building, are architects; Hans Von Unwerth, Finance Building, is engineer.

Western Automobile Co., 4820-32 Washington Boulevard, St. Louis, has asked bids on general contract for three-story and basement service, repair and sales building, 100 x 100 ft., to cost $100,000 with equipment. William Levy, Dolph Building, is architect.

Oklahoma Gas & Electric Co., Oklahoma City, Okla., is planning extensions and improvements in steam-operated electric power plant at Alva, Okla., including installation of additional equipment. Additions will also be made in transmission lines, entire project to cost over $80,000.

C. C. Hawkins, Arkadelphia, Ark., and associates have organized Arkadelphia Gravel Co., to construct and operate local sand and gravel plant, equipment to include steel bins, digging, hoisting, loading, conveying and other machinery. It is estimated to cost $100,000 with machinery.

Visco-Meter Corporation, St. Louis, Frank S. Wiemeyer, president, has been organized to manufacture Visco-Meter, an instrument designed to show viscosity of oil in a motor. Production will start in about 60 days at 2625 Locust Street.

Youngstown Tank & Boiler Co., Youngstown, Ohio, has purchased a factory at East St. Louis, which, with extensions and equipment, will represent an investment of about $75,000. William J. Patton, with office in Chemical Building, will be manager of plant. Company expects to begin production within a month.

Gulf States

BIRMINGHAM, June 17.—Plans are under way by G. A. Kelly Plow Co., Longview, Tex., manufacturer of plows and other agricultural equipment, for extensions and improvements in plant, with installation of additional equipment, to cost more than $30,000. R. M. Kelly is president.

San Angelo Cotton Oil Co., San Angelo, Tex., has authorized construction of one-story addition, 54 x 145 ft., to cost about $25,000.

Western Carbon Co., operated by Columbian Carbon Co., 45 West Forty-second Street, New York, is said to be planning installation of new unit at carbon black plant at Borger, Tex., including air compressors and other power equipment, to cost about $65,000. Two additional units

are also proposed at plant at Lefors, Tex., to cost about like sum.

Texas-Louisiana Power Co., Fort Worth, Tex., has arranged for a bond issue of $1,600,000, part of proceeds to be used for extensions and improvements. Company has acquired properties of Texas-New Mexico Power Co., and will carry out expansion program in that territory, including transmission line construction.

Plant and property of Perry Stave Co., Perry, Fla., have been acquired by new interests, headed by T. F. Williams, Trenton, Fla. New owners plan expansion, with machinery to manufacture wirebound oak barrels, to cost more than $40,000.

Mexican Aviation Co., Brownsville, Tex., W. L. Morrison, vice-president, a subsidiary of Pan-American Airways, Inc., 122 East Forty-second Street, New York, is planning construction of hangars, repair and reconditioning shops, oil storage and other field units at new airport to be located between San Benito and Harlingen, Tex., by both municipalities. Structures will cost about $60,000 with equipment; establishment of field, with buildings to be erected by cities will cost close to $100,000.

J. M. Spain, Millsaps Building, Jackson, Miss., architect has asked bids on general contract for two-story automobile service, repair and garage building, to cost about $100,000 with equipment.

Central Power & Light Co., San Antonio, Tex., operating electric light and power properties, gas and ice-manufacturing plants, is disposing of a bond issue of $6,800,000, part of fund to be used for extensions and improvements.

Southwestern Claude Neon Co., care of Elias Sternglanz, 1831 Texas Street, El Paso, Tex., president, recently organized with a capital of $100,000, is said to be planning operation of local plant to manufacture electric signs and displays.

Rio Grande Oil Co., El Paso, Tex., W. C. Pope, 525 East Seventh Street, general manager, has approved final plans for addition to local refinery for lubricating oil production, to cost $850,000 with machinery. Headquarters of company are at 417 South Hill Street, Los Angeles.

Rubber Products Corporation of Alabama, Inc., Muscle Shoals, Ala., has plans for expansion, including installation of additional equipment for production of rubber flooring and other hard rubber products. Company has arranged for increase in capital to $200,000, part of fund to be used for development. It has purchased Maumee Valley Rubber Co., Toledo, Ohio, and will operate as an affiliated organization. Carroll Dunn, president of the *Toledo Blade*, heads company.

Indiana

INDIANAPOLIS, June 17.—Contract has been let by Empire Oil & Refining Co., Empire Building, Bartlesville, Okla., to H. B. Olney, 1200 East Chicago Avenue, East Chicago, Ind., for new oil refinery at East Chicago, to cost more than $2,500,000 with equipment. C. Briggs is company engineer, in charge.

Thornton & Rodecker, 658 Fairfield Avenue, Indianapolis, architects, have awarded general contract to Service Construction Co., Castle Hall Building, for automobile service, repair and garage building, to cost about $100,000 with equipment.

Indiana State Normal School, Calvert Avenue, Muncie, L. A. Pittenger, president, has awarded general contract to A. J. Glaser, 610 South Jefferson Street, for two-story vocational training school addition, to cost about $60,000 with equipment. Snyder & Babbitt, Hayden Building, Columbus, Ind., are architects.

Supreme Oil & Refining Co., Lumber Insurance Building, Indianapolis, specializing in production of fuel oil, has plans for new refinery on 35-acre tract, with initial unit to cost about $100,000 with equipment. Irving W Lemaux is president

United States Corrugated Fibre Box Co., 1315 Martindale Avenue, Indianapolis, has awarded general contract to Shaner Brothers, 1025 Lewis Street, for rebuilding part of four-story plant, 100 x 160 ft., to cost over $60,000 with equipment.

N. O. Nelson Mfg. Co., Noblesville, manufacturer of plumbing equipment and supplies, is planning to rebuild part of plant recently destroyed by fire. Headquarters are at Tenth and Chestnut Streets, St. Louis.

Pacific Coast

SAN FRANCISCO, June 13.—Bids will be asked early in July by Port Stockton Cement Co., 1101 Claus Spreckles Building, San Francisco, for initial units for cement mill near Sonora, Cal., to cost about $2,000,000 with machinery. Company was organized recently by W. C. Stevenson, formerly connected with Pacific Portland Cement Co., and others. A. E. Roberts, address noted, is company engineer.

Hollywood Casket Co., 1024 North Orange Drive, Hollywood, Cal., has plans for two-story plant, 88 x 200 ft., to cost about $55,000 with equipment. Pope & Burton, Beaux Arts Building, Los Angeles, are architects.

Barshow & Baleria, 501 South Market Street, San Jose, Cal., manufacturers of automobile bodies, have plans for new one-story plant, to cost about $25,000 with equipment.

Escondido Union High School District, Escondido, Cal, has authorized plans for new high school group, including one-story manual arts and shop building, entire project to cost $125,000. T. C. Kistner & Co., Architects' Building, Los Angeles, are architects.

Goodyear Tire & Rubber Co., Akron, Ohio, has awarded general contract to S. E. Mulcock, 1240 Harvard Avenue, Salt Lake City, Utah, for one-story factory branch and distributing plant, 100 x 140 ft., at Salt Lake City, to cost about $80,000 with equipment. Slack Winburn, Beason Building, Salt Lake City, is architect.

Boeing Airplane Co., Hoge Building, Seattle, has awarded general contract to Austin Co., for hangar, 100 x 200 ft., with shop and repair facilities, to cost $70,000 with equipment.

Zellerbach Paper Co., Sacramento, Cal., is planning to rebuild part of factory branch and distributing plant at Spokane, Wash., destroyed by fire, June 4.

Washington Irrigation & Development Co., Seattle, has applied for permission to use water from Columbia River near Priest Rapids, Grant and Yakima Counties, for hydroelectric power development. Project will provide for generating plant of 450,000-hp. capacity, divided into two units, first of 200,000-hp. output to be ready for service in about 24 months. Work will include a steel tower transmission line, and will cost more than $35,000,000.

Breese Aircraft Corporation, Portland, has been organized to take over and operate company of same name with local airplane manufacturing plant. New company has arranged for early sale of 40,000 shares of stock, no par value, part of fund to be used for general expansion.

Canada

TORONTO, June 17.—Machine tool sales fell off during the week, but inquiries are in good volume. Current demand is confined to single tools. Industrial building is being carried out on a large scale and there are a number of companies with construction work sufficiently advanced to warrant equipment purchases soon. The railroads are also expected to come into the market within the next two or three months. Small tools are moving freely.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, contemplates an addition to its plant at Bowmanville, Ont. C. H. Carlisle, 152 Simcoe Street, Toronto, is manager.

Bids are being received, no closing date set, for three-story factory addition at Stratford, Ont., for Kroehler Mfg. Co., to cost $40,000.

Office Specialty Mfg. Co., Newmarket, Ont., has awarded general contract to Herod Construction Co., Mimico, Ont., for a three-story addition.

Several contracts have been awarded for a $200,000 factory to be erected at Toronto, for the F. J. Hartz Co., Ltd.

Fegles Construction Co., Port Arthur, Ont., has been awarded general contract for an addition to Sarnia Grain Elevator, Sarnia, Ont., to cost $593,050.

Western Canada

Contracts totalling $2,072,000 have been awarded in connection with the $7,250,000 hydroelectric power development on the Stave River at Ruskin, for the British Columbia Electric Railway Co., Vancouver, B. C. The contract for the power plant has not been let.

Cater-Halls-Aldinger Co., Ltd., has been awarded contract for 2,750,000-bu. addition to elevator at Vancouver, B. C., for Alberta Wheat Pool. C. D. Howe & Co., Ltd., Port Arthur, Ont., is consulting engineer.

Foreign

PLANS are being considered by Cros Sociedad Anonima, Barcelona, Spain, for new plant near Corunna for production of sulphuric acids, superphosphates and kindred specialties, to cost more than $600,000 with machinery. It is proposed to secure phosphate rock from Morocco, and iron pyrites from Huelva district.

Samuel R. Rosoff, head of Rosoff Subway Construction Co., 461 Eighth Avenue, New York, has contracted with Soviet Russian Government, Moscow, to construct a waterworks in that municipality to cost $40,000,000, project to be completed within 36 months. It will include power equipment, pumping machinery, pipe lines, etc. Amtorg Trading Corporation, 261 Fifth Avenue, New York, is official buying agent for Soviet Union.

Leslie Barlow-Massicks, sales manager, Steel, Peech & Tozer, Ltd., Rotherham, England, manufacturer of Iron and steel products, is at head of project to establish new plant to manufacture steel springs. A company will be formed. A part of former steel plant of John Spencer & Son Ltd., Newburn, Newcastle-on-Tyne, has been purchased from T. W. Ward & Co., Ltd., Sheffield, which recently acquired the property.